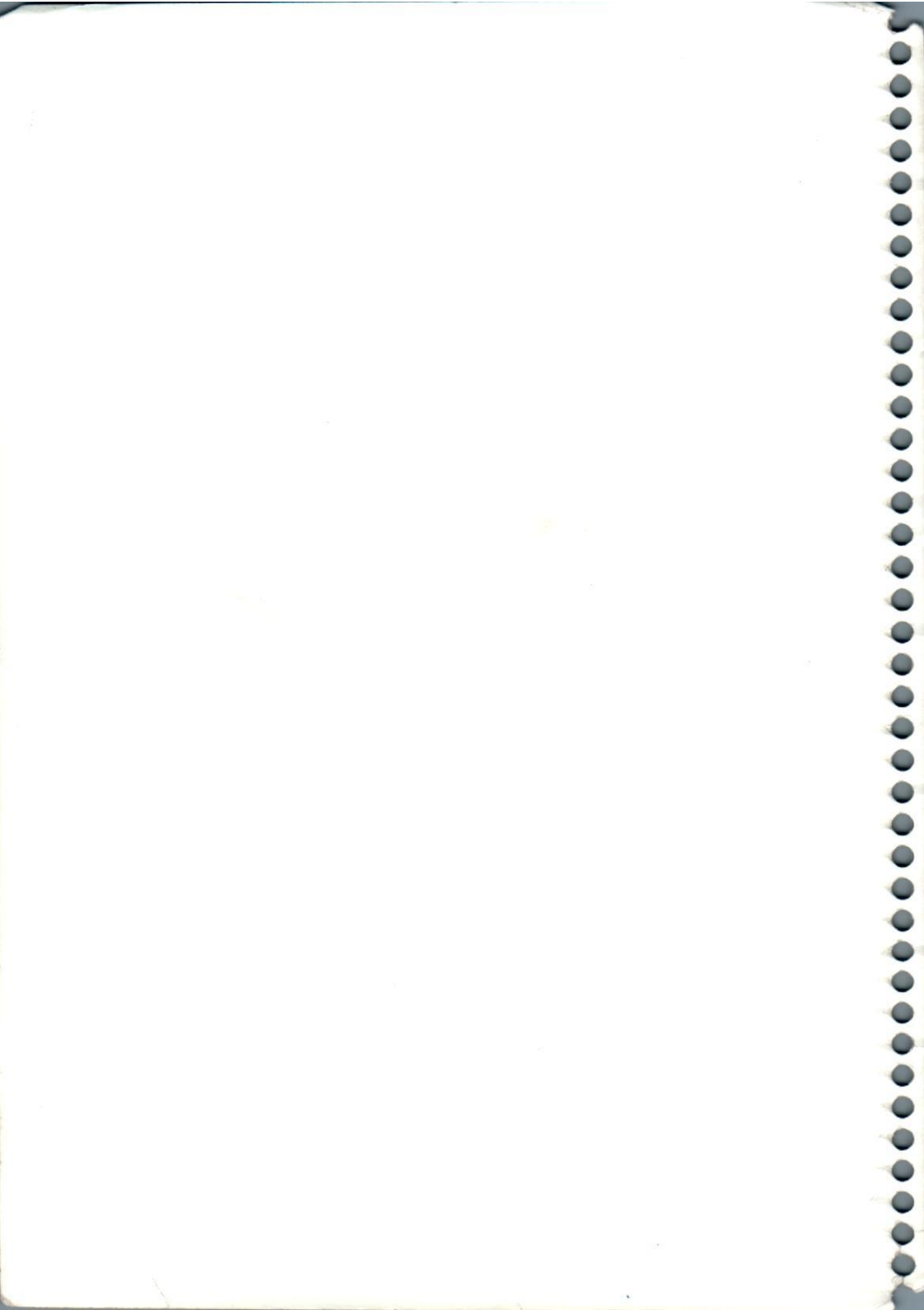


M. DR5

norstar

**Modular DR5
Installer Guide**





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Networking with Norstar

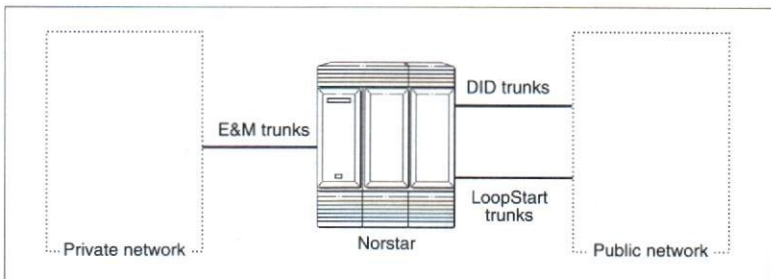
Norstar can now be part of a corporate telecommunications network. You can connect Norstar to an existing private network, or to other Norstar systems to form a Norstar network.

This chapter explains:

- how Norstar components behave in a network,
- how they benefit your business, and
- how you can configure Norstar to achieve those benefits.

The Big Picture

Norstar uses enhanced trunking to join other Norstar or customer equipment in a private network. Authorized users can also access tie-lines, Central Office lines, and Norstar features from outside the Norstar system.



Norstar as an OPX

Norstar can be used as an off premise extension (OPX) from a PBX. In order to support this application, the OPX lines must be engineered not to exceed 8 dB total loop loss from the serving central office to the demarcation point at the Norstar KSU.

Bits and pieces

The trunks and lines that Norstar uses make network access possible. Target lines concentrate incoming calls on fewer trunks, and three types of trunks provide the network access:

- E&M trunks handle incoming and outgoing traffic between the Norstar system and the private network.
- DID trunks route incoming calls from the public network directly to telephones within Norstar, without an attendant.
- loop start trunks handle incoming and outgoing calls between Norstar and the public network.

Benefits

Security

Norstar provides the security that expanded access demands. You can:

- control remote access to tie-lines, Central Office lines, and system features by setting up a specific Class of Service for each type of caller,
- restrict outgoing calls to certain telephone numbers or area codes by applying dialing filters to lines and telephones, and
- screen remote callers by configuring trunks to answer with DISA, a system response that requires callers to enter a valid password.

Unified dialing plan

When you link a number of Norstar systems into a network, you can configure them so that the length of Directory Numbers (DNs), the line pools, and the line pool access codes are consistent from one system to the next.

Call handling capabilities

In the Norstar system, the concentrated environment supports call handling features on up to 184 lines, of which 80 are physical trunks and 104 are target (virtual) lines.

Customer use

Callers in the public network can:

- call directly to one or more Norstar telephones,
- call into the Norstar system and select outgoing tie-lines to access the private network,
- call into the Norstar system and select outgoing Central Office lines to access the public network, and
- call into the Norstar system and use remote features.

Callers in the private network can:

- call directly to one or more Norstar telephones,
- call into the Norstar system and select outgoing tie-lines to access other nodes in the private network,
- call into the Norstar system and select outgoing Central Office lines to access the public network, and
- call into the Norstar system and use remote features.

Callers in the Norstar system can:

- call directly to a specific Norstar telephone,
- select outgoing tie-lines to access the private network,
- select outgoing tie-lines to access features that are available on the private network,
- select outgoing Central Office lines to access the public network, and
- use all of the Norstar features.

Bits and pieces

To understand the capabilities that are described later in this chapter, you need to know how the trunks and lines behave in the Norstar system.

A trunk is a physical connection between the Norstar system and the outside world. A line is a flexible communication path between a Norstar user and the outside world. This allows a one-to-many relationship between trunks and lines.

What this means is that one trunk does not have to represent one line, but can represent several lines. You achieve this in two ways:

1. **Auto-answer trunks** — If you want one trunk to serve many lines, you configure it as Auto-answer. The Norstar system answers calls and maps incoming digits onto numbers that you define in programming. The numbers can access the system, so that callers can then use selected features or call out to another destination (calling through the system). The numbers can also access target lines that appear on one or more Norstar telephones.
2. **Target lines** — Incoming calls on one trunk can map onto a number of different target lines. These are virtual lines that can appear on a Norstar telephone like any other line. They are incoming lines only, and cannot be selected for outgoing calls. They are identified to the system by their number. Any line with a number from 081 to 184 is a target line.

Of course, you can still have a one-to-one relationship between a trunk and a line. In this case, you configure the trunk as manual-answer.

You can read more on target lines in the Programming chapter. To learn more about the types of trunks and the important differences between auto-answer and manual-answer trunks, read on.

Loop start trunks

Loop start trunks give you incoming and outgoing access to the public network. However, you would typically configure your system with loop start trunks for outgoing calls and DID trunks for incoming calls. Loop start trunks can be configured as manual-answer or auto-answer.

When a call comes in on a manual-answer loop start trunk, it alerts at all telephones with that line appearance.

When a call comes in on an auto-answer loop start trunk, you hear a stuttered dial tone if the trunk is configured to answer with DISA. Then you must use a DTMF telephone to enter a 6-digit Class of Service password.

When a call comes in on an auto-answer loop start trunk, you hear the system dial tone if the trunk does not have DISA, or if the Class of Service password is valid. Use a DTMF telephone to enter a target line number, the DISA DN, a line pool access code, or a remote feature code.

To place an outgoing call, select a loop start line by dialing a line pool access code, pressing a line button on the telephone, or pressing a memory button that has been programmed with a line pool access code.

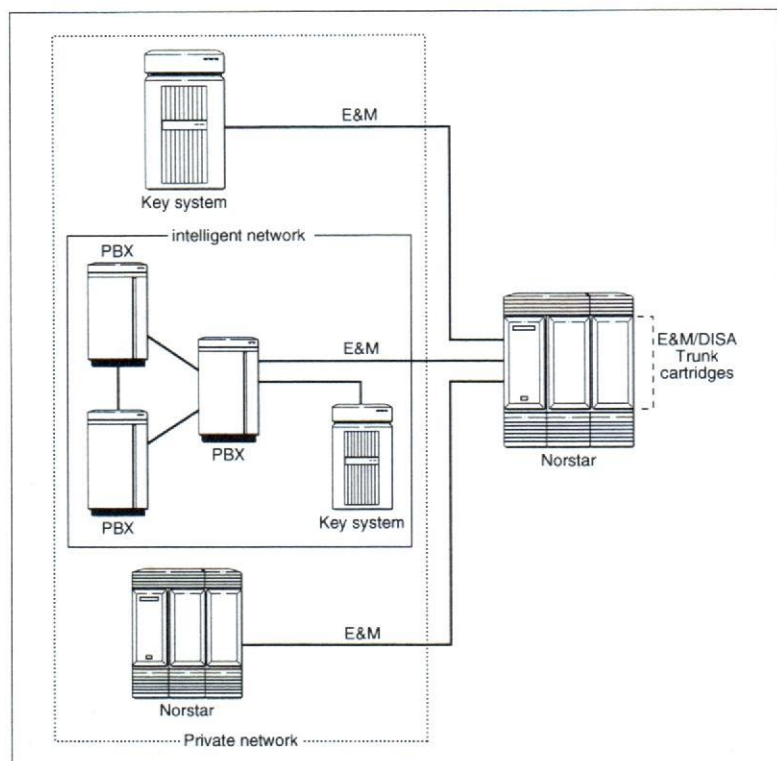
Configuration requirements

You need one Loop Start Trunk Cartridge or CI Trunk Cartridge for every four trunks beyond the eight that come with the Key Service Unit. If you wish to configure your loop start lines as auto-answer, the lines must have disconnect supervision. You will also need one E&M/DISA Trunk Cartridge for every two loop start lines that you configure as auto-answer. An auto-answer loop start trunk can give you the same kind of direct inward dialing function as a DID trunk, but you will require E&M/DISA Trunk Cartridges to receive the incoming digits from the Central Office.

You may configure a loop start line as the Prime line for a Norstar telephone.

E&M trunks

An E&M trunk gives incoming and outgoing tie-line access from other systems in the private network to the Norstar system. E&M trunks can be configured as manual-answer or auto-answer.



When a call comes in on a manual-answer E&M trunk, it alerts at all telephones with that line appearance.

When a call comes in on an auto-answer E&M trunk, you hear a stuttered dial tone if the trunk is configured to answer with DISA. Then you must use a DTMF telephone to enter a 6-digit Class of Service password.

When a call that comes in on an auto-answer E&M Trunk, you hear the system dial tone if the trunk does not have DISA, or if the password is valid. Use a DTMF telephone to enter a target line number, the DISA DN (the number that will call for a Class of Service password), a line pool access code, or a remote feature code.

When a call comes in on an auto-answer E&M trunk from an intelligent network, the Norstar system answers the call and interprets the incoming digits:

- If the digits map onto a target line, Norstar routes the call to all Norstar devices with an appearance of that line.
- If the digits map onto the DISA DN, you hear a stuttered dial tone, and must use a DTMF telephone to enter a valid Class of Service password to get the system dial tone.
- If the digits map onto the Auto DN (the number for direct system access), you hear the system dial tone, and can use a DTMF telephone to enter a target line number, the DISA DN, a line pool access code, or a remote feature code.

To place an outgoing call, select an E&M trunk by dialing a line pool access code, pressing a line button on the telephone, or pressing a memory button that has been programmed with a line pool access code.

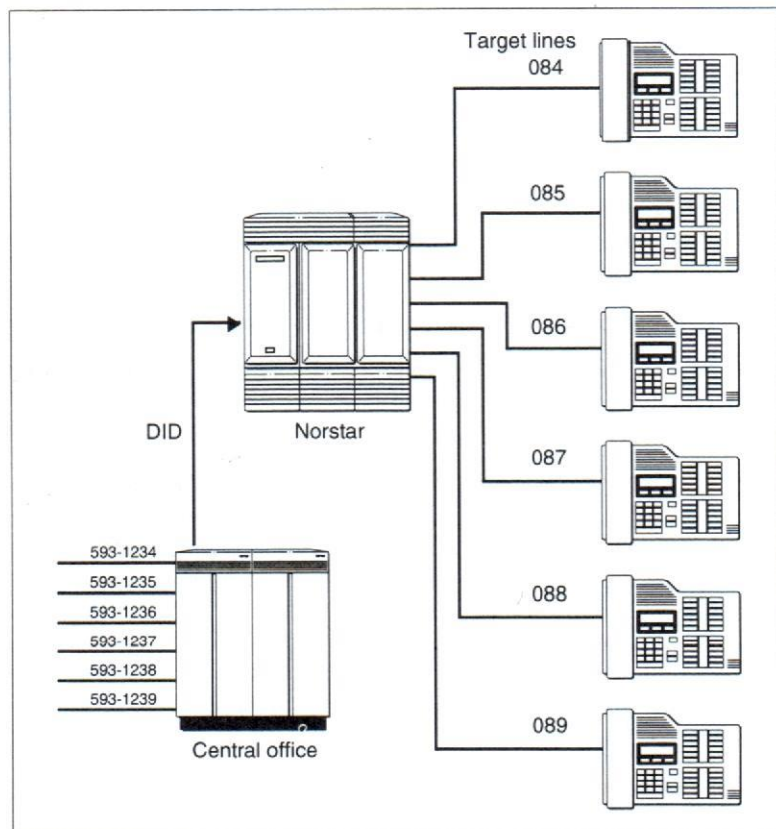
Configuration requirements

In your configuration, one E&M/DISA Trunk Cartridge is required for every two E&M trunks. One E&M/DISA Trunk Cartridge is also required for every two DTMF receivers required for DISA on loop start trunks.

You may configure an E&M trunk as the Prime line for a Norstar telephone.

DID trunks

DID trunks give you direct inward dialing (DID) from the public network to the Norstar system. A typical application of these trunks is to map incoming digits onto target line appearances within the Norstar system. DID trunks can operate only as auto-answer trunks.



When a call comes in on a DID trunk, Norstar interprets the incoming digits:

- If the digits map onto a target line, Norstar routes the call to all Norstar devices with an appearance of that line.
- If the digits map onto the DISA DN, you hear a stuttered dial tone, after which you must use a DTMF telephone to enter a valid Class of Service password to get the system dial tone.
- If the digits map onto the Auto DN, or if the Class of Service password is valid, you hear the system dial tone. Then you can use a DTMF telephone to enter a target line number, a line pool access code, or a remote feature code.

Configuration requirements

You need one DID trunk cartridge for every four DID trunks. Each DID Trunk Cartridge has four DID trunks and four DTMF receivers dedicated to those trunks.

You cannot configure a DID trunk as the Prime line for a Norstar telephone.

Benefits

Security

In the Capabilities section of Administration programming, there are several ways of protecting your Norstar system from unauthorized access.

Class of Service

Class of Service refers to the capabilities that Norstar provides to users who access the system from the public or private network. The Class of Service includes:

- filters that restrict dialing on the line, and
- an access package, which defines the set of line pools that may be accessed and whether or not the user has access to the paging feature.

The Class of Service that is applied to an incoming remote-access call is determined by:

- the filters that you apply to the incoming trunk, or by
- the Class of Service password that the caller used to gain access to the Norstar system.

In cases where DISA is not applied to incoming calls, the remote caller can change the Class of Service by dialing the DISA DN and entering a Class of Service password.

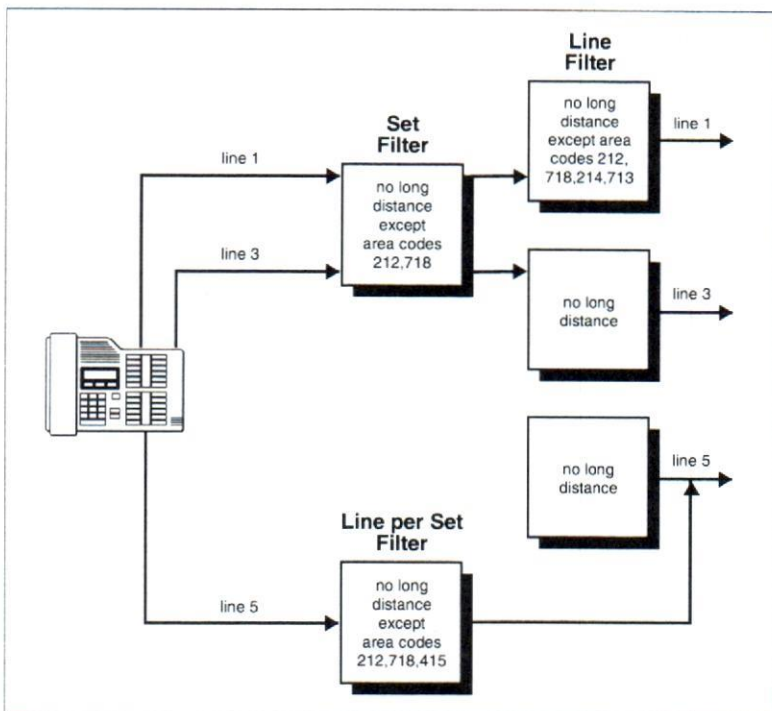
To program Class of Service passwords, see Administration in the Programming chapter.

Dialing filters

You can use dialing filters to restrict the numbers that may be dialed on any external line within your Norstar system. You may specify up to 100 dialing filters for the system. A dialing filter consists of up to 48 restrictions and their associated exceptions.

Dialing within the system

To restrict dialing within the system, you can apply dialing filters to outgoing external lines (as line filters), to telephones (as set filters), and to external lines on specific telephones (as line per set filters).



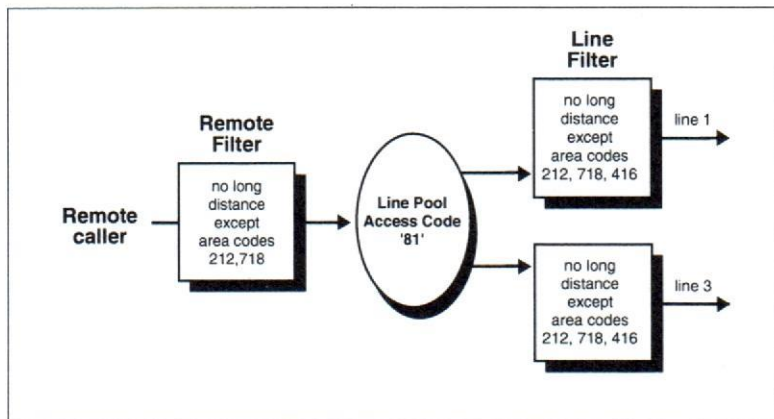
Dialed digits must pass both the line filter and the set filter. The line per set filter overrides the line filter and set filter.

In this diagram, a caller using line 1 could only dial long-distance numbers to area codes 212 and 718. A caller using line 3 could not dial any long-distance numbers. A caller using line 5 could dial long-distance numbers to area codes 212, 718, and 415.

Note: Set filters have no effect on the numbers that are dialed on an E&M trunk.

Dialing outside the system

To restrict dialing outside the system (once a caller gains remote access), you can apply dialing filters to incoming external lines (as remote filters).



In this case, dialed digits must pass both the remote filter and the line filter. A remote caller can override these filters by dialing the DISA DN and entering a Class of Service password.

For programming instructions, see the Programming chapter of this Installer Guide.

Direct inward system access (DISA)

To control access from the public or private network, you can configure auto-answer trunks to answer with DISA. Remote callers hear a stuttered dial tone and must then enter a Class of Service password that determines what they are allowed to do in the system.

Auto-answer loop start and E&M trunks are configured to answer with DISA by default.

Note: You must have one E&M/DISA Trunk Cartridge for every two auto-answer loop start trunks.

DID trunks cannot be configured to answer with DISA. If you want incoming DID calls to be answered with DISA, configure the system with a DISA DN. Incoming DID calls that map onto the DISA DN are then routed to a line that has DISA.

For programming instructions, see the Programming chapter of this Installer Guide.

Unified dialing plan

The Norstar system does not support a coordinated dialing plan for other systems in the network. However, if you are configuring more than one Norstar system in your network, you can make access between the systems much easier with a unified dialing plan.

Directory Numbers

Make sure that the length of your DNs is the same for all the Norstar systems.

Line pools

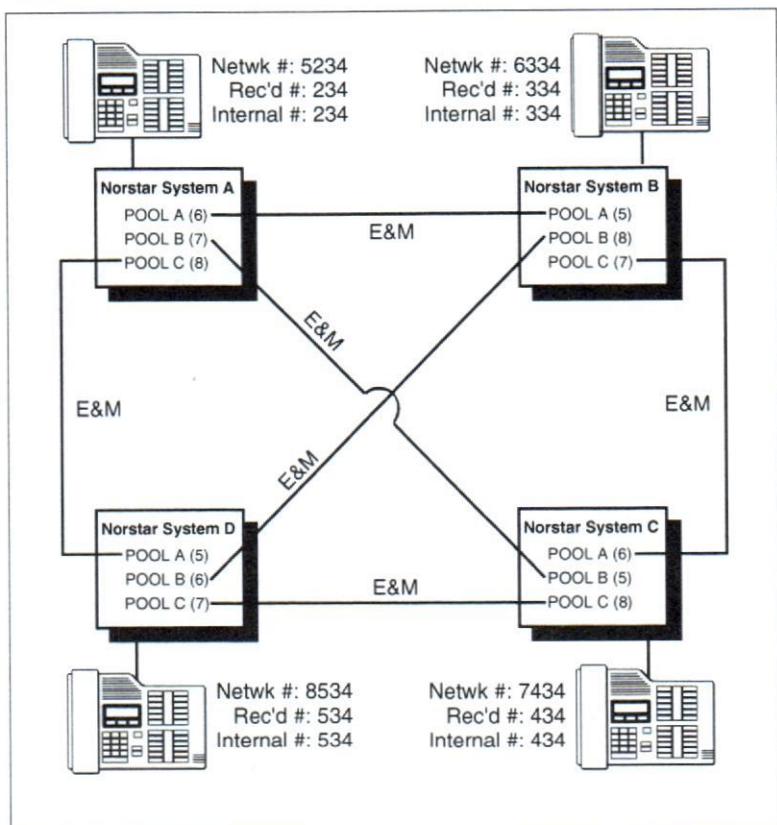
If the Norstar systems are close to each other geographically, you can conserve resources by not duplicating access. For example, system A has a line pool to New York, System B has a line pool to Los Angeles, and system C has a line pool to Dallas. A Norstar user in system A calls system C to get the line pool to Dallas.

Line pool access codes

To simplify access between Norstar systems, all line pools that go to the same destination should have the same line pool access code. For example, system A and system B both have a line pool to London. You can configure both systems with the same line pool access code for the Nashville line pool.

Unified dialing plan among four systems

A dialing plan similar to the one in the following figure will let you create a company directory that includes the line pool access codes.



For instance, the person on System A at telephone 234 can select an Intercom button and dial 7434.

This means that telephone 234 has dialed the line pool access code of the trunk to System C, and will receive the dial tone of System C. The digits 434 then map to the Received number 434, and ring telephone 434 with an appearance of the associated target line.

Call handling with target lines

Having target lines with the Norstar system means that call coverage is extended. All call handling features that apply to regular lines also apply to target lines.

Here are some brief descriptions of features that apply to any line appearance on a Norstar telephone. For complete information on these features, see the Telephone features chapter of this Installer Guide.

Auxiliary Ringing

If the Norstar system has an auxiliary ringer (a bell that is not part of a telephone), the target line can be administered so that the auxiliary ringer alerts in addition to the telephone ringer.

Callback

When an external call on a target line is transferred to a busy telephone or not answered after a specified number of rings, the call automatically rings at the Prime telephone for that line. The display shows that the telephone was busy or that the call was not answered.

Camp on

Even when a telephone is busy, a call on a target line can be routed to the telephone, where it waits in a queue until the telephone is not busy.

Delayed Ring Transfer

Target line calls that go unanswered after a specified number of rings can be routed to the Prime telephone if programmed to do so in Configuration.

Held Line Reminder

When a target line call is placed on hold, the telephone gives two reminder tones at periodic intervals until the call is taken off hold. This happens only if Held reminder is activated during Configuration programming.

Overflow Call Routing

If a call comes in for a target line that is busy, Norstar routes the call to the Prime telephone for that target line. If you don't assign a Prime telephone for the target line or if a call cannot be mapped onto a target line, the call will go to the Prime telephone for the incoming trunk.

Prime Telephone Call Capture features

See the Prime Telephone User Card for details.

Privacy

When a Norstar user is on an external call and the Privacy feature is turned on, no other Norstar telephone with the same target line can join in on the call. If Privacy is turned off, another person with the same line can press the line button to join your conversation, forming a conference.

Service Modes

When there are fewer people available to answer calls during lunch hours, nights, or weekends, you can administer the system so that target line calls ring at certain telephones.

Customer Use

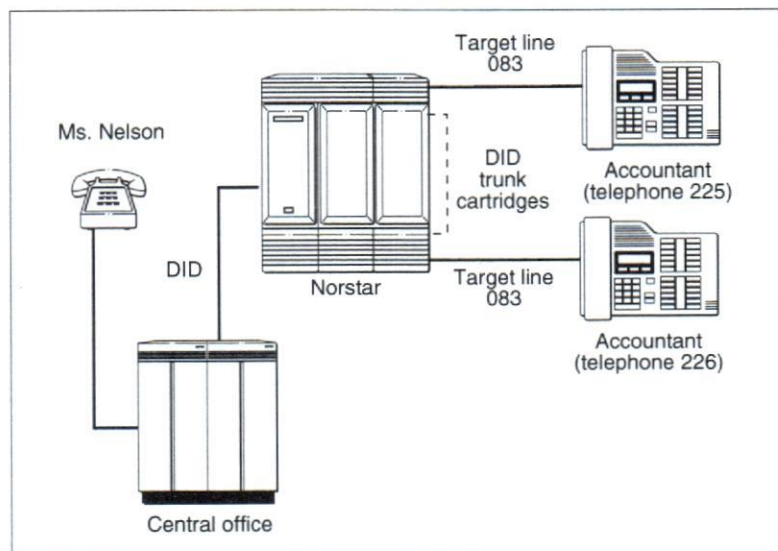
This section shows sample configurations for different types of network access. Each example has four parts:

- A scenario explains the caller's goal and what is required to achieve it.
- A diagram shows the network configuration that supports the application.
- A list shows the Norstar hardware required to support the configuration.
- Tables show the Configuration and Administration programming required. Only those settings that are important to network access are described here.

In the public network

Call one or more Norstar telephones

Ms. Nelson is a bank customer who has a question for an accountant. She dials the telephone number that maps onto target line 083. All of the accountants' telephones ring.

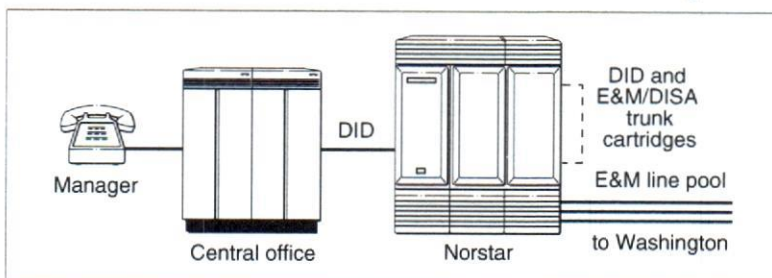


Hardware: any version of KSU, one Trunk Module, one DID Trunk Cartridge.

Heading	Parameter	Setting
1. Trk/Line Data	Rec'd # Line 009	4321 (for Line 083) DID
5. System Data	Rec'd # length	4 (can be up to 7 digits, but must match number of digits sent by Central Office)

Call Norstar and select tie lines to a private network

A manager in Georgia wants to use the tie lines at headquarters to call Washington. He dials a telephone number that maps onto the DISA DN, enters a Class of Service (COS) password, then dials a line pool access code to select a tie line to Washington.

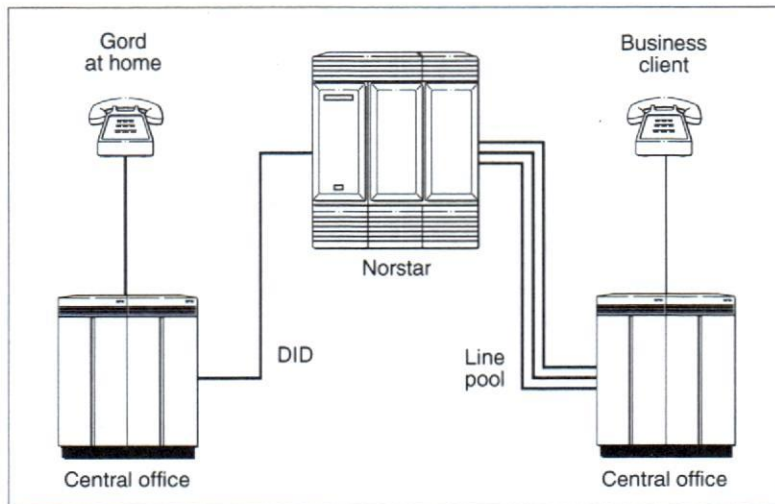


Hardware: any version of KSU, one Trunk Module, one DID Trunk Cartridge, two E&M/DISA Trunk Cartridges (for the three trunks in the line pool to Washington).

Heading	Parameter	Setting
Incoming trunk:		
1. Trk/Line Data	Line 009	DID
4. Miscellaneous	DISA DN	5321
5. System Data	Rec'd # length	4 (can be up to 7 digits, but must match number of digits sent by Central Office)
Outgoing trunk:		
1. Trk/Line Data	Line 013 Line type	E&M Pool F
4. Miscellaneous	Line pool F	6 (up to 4 digits)
5. Capabilities		Define filters. Define remote access pkgs. Assign a dialing filter to the line. Assign COS passwords and filters for each class of service.

Call Norstar and select lines to the public network

Gord wants to make a long-distance business call from home. To avoid being charged, he dials the telephone number that maps onto the Auto DN at work. After hearing the dial tone, Gord dials a line pool access code to select a line to the public network. He then dials the long-distance number.



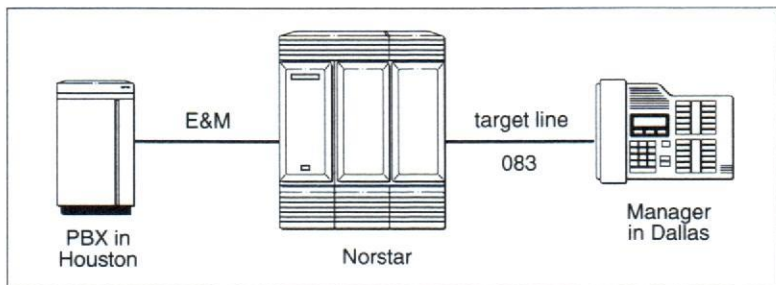
Hardware: any version of KSU, one Trunk Module, one DID Trunk Cartridge.

Heading	Parameter	Setting
Incoming trunk:		
1. Trk/Line Data	Line 009	DID
4. Miscellaneous	Auto DN	4321
5. System Data	Rec'd # length	4 (can be up to 7 digits, but must match number of digits sent by Central Office)
5. Capabilities		Define dialing filters. Define remote access packages. Assign a remote filter and remote package to the line.
Outgoing trunk:		
1. Trk/Line Data	Line 001 Line type	Loop Pool A
4. Miscellaneous	Line pool A	1234
5. Capabilities		Assign a dialing filter to the line.

In the private network

Call one or more Norstar telephones

The production supervisor in Houston selects the less-expensive company tie line to call the manager at the Administration office in Dallas. Once the line is selected, the production supervisor dials the digits that will map onto the target line of the manager in Dallas.

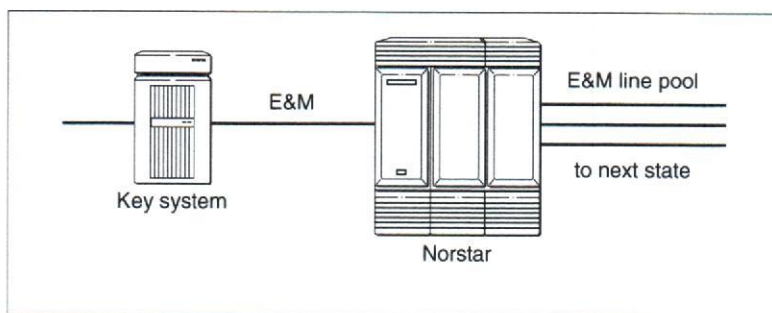


Hardware : any version of KSU, one Trunk Module, one E&M/DISA Trunk Cartridge.

Heading	Parameter	Setting
Incoming trunk:		
1. Trk/Line Data	Rec'd #	4321(for target line 083)
	Line 009	E&M
	Ans Mode	Auto
5. System Data	Rec'd # length	4 (can be up to 7 digits, but must match number of digits sent by Central Office)

Call Norstar and select tie lines to other nodes in the private network

At a branch office, Joan selects a tie line to the government office downtown. After hearing the dial tone, she dials a line pool access code to select another tie line to a government office in the next town.

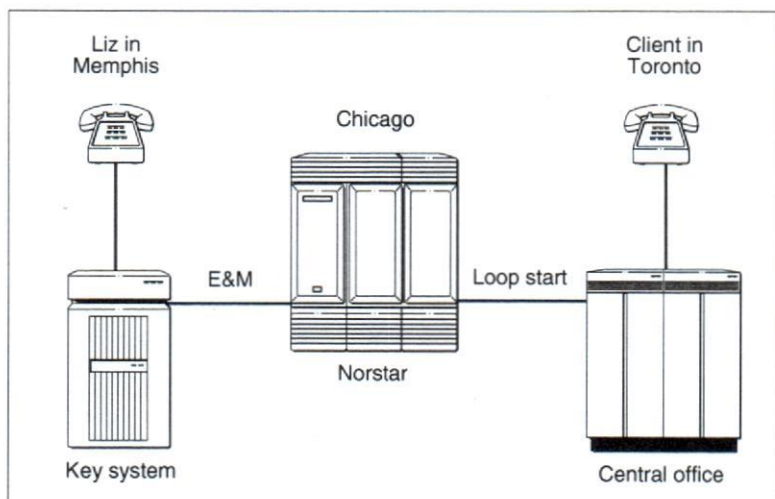


Hardware: any version of KSU, one Trunk Module, two E&M/DISA Trunk Cartridges (for the three lines in the line pool and the one incoming line)

Heading	Parameter	Setting
Incoming trunk:		
1. Trk/Line Data	Line 009 Ans mode	E&M Auto
5. Capabilities		Define dialing filters. Define remote access packages. Assign a remote line filter and remote package to the trunk.
Outgoing trunk:		
1. Trk/Line Data	Line 010 Line type	E&M Pool D
4. Miscellaneous	Line pool D	71 (up to 4 digits)
5. Capabilities		Assign a dialing filter to the trunk.

Call Norstar and select lines to the public network

Liz needs to call long-distance to a client in Toronto. She selects a tie-line to the branch office in Toronto. After hearing the dial tone, she dials a line pool access code to select a line to the public network. Then, she dials the client's number as a local call.



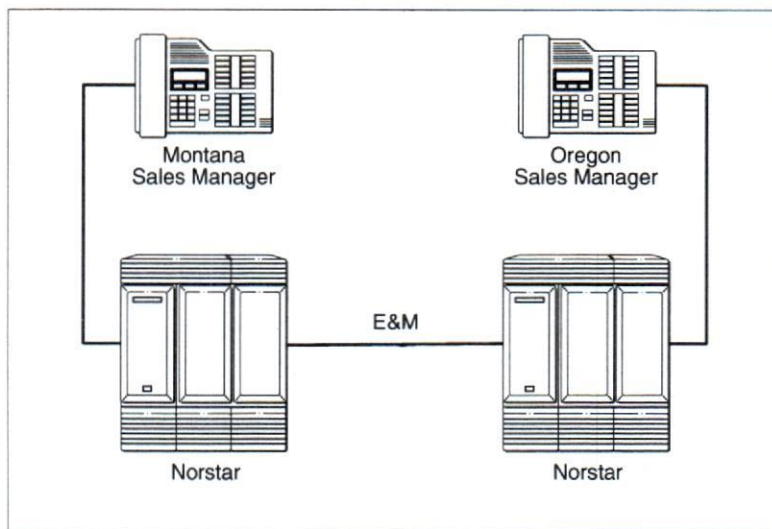
Hardware: any version of KSU, one Trunk Module, one E&M/DISA Trunk Cartridge.

Heading	Parameter	Setting
Incoming trunk:		
1. Trk/Line Data	Line 009 Ans mode	E&M Auto
5. Capabilities		Define dialing filters. Define remote access packages. Assign a remote filter and remote package to the trunk.
Outgoing trunk:		
1. Trk/Line Data	Line 001 Line type	Loop Pool B
4. Miscellaneous	Line pool B	73 (up to 4 digits)
5. Capabilities		Assign a dialing filter to the line.

In the Norstar system

Select tie trunks to the private network

For a confidential call, the Montana sales manager presses the line button for a private E&M trunk to the Oregon office. This automatically alerts at the line appearance on the telephone of the Oregon sales manager.

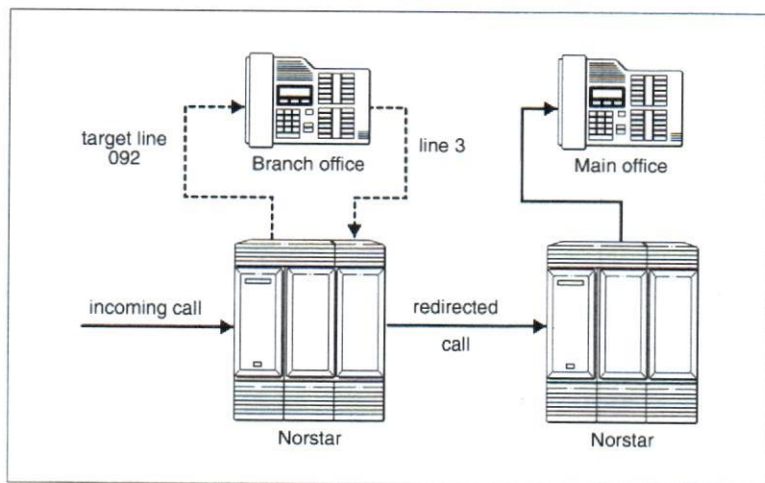


Hardware: (for both systems) any version of KSU, one Trunk Module, one E&M/DISA Trunk Cartridge

Heading	Parameter	Setting
Outgoing trunk (Montana):		
Trunk Data (Line 009)	Line	E&M
Line Data (Line 009)	Line type	Private
Incoming trunk (Oregon):		
Trunk Data (Line 009)	Line	E&M
	Ans mode	Manual
	Line type	Private

A Norstar System Feature

Line Redirection feature



The branch office is receiving more calls than it can handle, so it redirects one of its lines to the main office. All calls that come in on target line 092 will be routed out on line 003 to the main office. Whenever a call is redirected, the target line and outgoing line will be busy for the duration of the call.

Hardware : Version 2 or higher KSU, an E&M/DISA Trunk Cartridge if the incoming trunk is E&M, or a DID Trunk Cartridge if the incoming trunk is DID.

Note: Any line appearance on a telephone can be selected as the incoming line to be redirected. A target line can not be selected as the outgoing line for redirection.

Note: The incoming trunk must have disconnect supervision.

Program heading	Setting
Incoming trunk:	
1. Trk/Line Data	Line001:Loop Trunk mode:Super Ans mode:Auto OR Line 009:DID OR Line 013:E&M Ans mode:Auto
5. System Data	Rec'd #:4321 (for target line 092) Rec'd # length:4 (can be up to 7 digits, but must match number of digits sent by Central Office)
Outgoing trunk:	
1. Trk/Line Data	Line 003:Loop OR Line014:E&M
Branch office set:	
5. Capabilities	Allow redirect:Y

Installation

Check the location where the Norstar system modules, the telephones, and auxiliary equipment are to be installed. This includes making sure sufficient space is available to install the components.

Location requirements

- Clean, dry, and well-ventilated
- Temperature: 0°C to 50°C (32°F to 122°F)
- Humidity: 5% to 95%, non-condensing
- Location: at least 4 m (13.1 ft) from equipment such as photocopiers, electrical motors, and other equipment that can produce electromagnetic, radio frequency, and electrostatic interference.

Electrical requirements

- Non-switched outlet
- ac outlet located not more than 1.5 m (4.9 ft) from the Key Service Unit (KSU). The actual distance from the KSU to the Power Bar may vary with additional Trunk and Station Modules. Do not use an extension cord between the KSU and the power bar.

For the 110 V system

- Dedicated 110-V ac nominal, 50/60-Hz, 15-A minimum service with third wire ground.

For the 220 V system

- Dedicated 220- to 240-V ac nominal, 50/60-Hz, 10-A minimum service with third wire ground.

WARNING

The ac outlet must be equipped with a third wire ground to avoid electromagnetic interference.

Internal wiring requirements

All new or existing wiring for Norstar telephones must meet the following specifications:

- one twisted pair per telephone
- a dc loop resistance less than 59 Ω
- cable length (0.5 mm or 24 AWG) not to exceed 305 m (1000 ft)
- use of a Norstar Station Auxiliary Power Supply (SAPS) to extend the loop up to 790 m if the cable is longer than 305 m (1000 ft)
- no bridge taps

WARNING

Installers should also check the lightning protectors at the cable entry point to the building with special attention to the grounding. Any problems should be reported to the telephone company in writing. Norstar telephone wiring should not leave the buildings as it is not lightning-protected.

Mounting requirements

If a smooth surface is not available, cut a backboard large enough to accommodate the system modules and the distribution block. The system module physical dimensions are listed in this chapter.

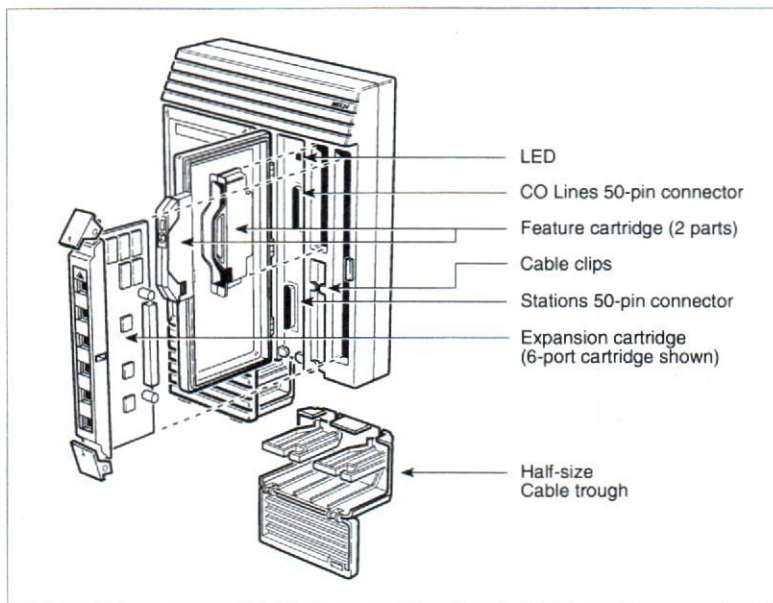
Equipment for mounting the modules

- screwdriver, diagonal cutters, pliers, connecting tool, pencil, level (optional)
- four 19-mm ($3/4$ -in) long wood screws for the KSU and four for each of the expansion modules
- 38-mm ($1\frac{1}{2}$ -in) long screws for the cable troughs
- 19-mm ($3/4$ -in) thick wooden backboard (if necessary)

Module installation

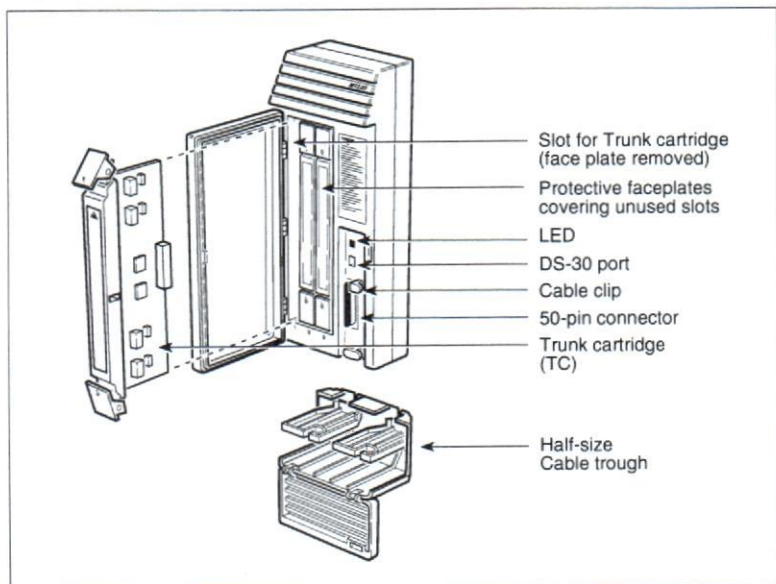
Key System Unit (KSU)

The Key Service Unit (KSU) is the hub of the Norstar System. It can function on its own as a basic system (with up to 24 Norstar telephones and eight external lines). The system may also be expanded with any combination of up to six Trunk Modules and/or Station Modules.



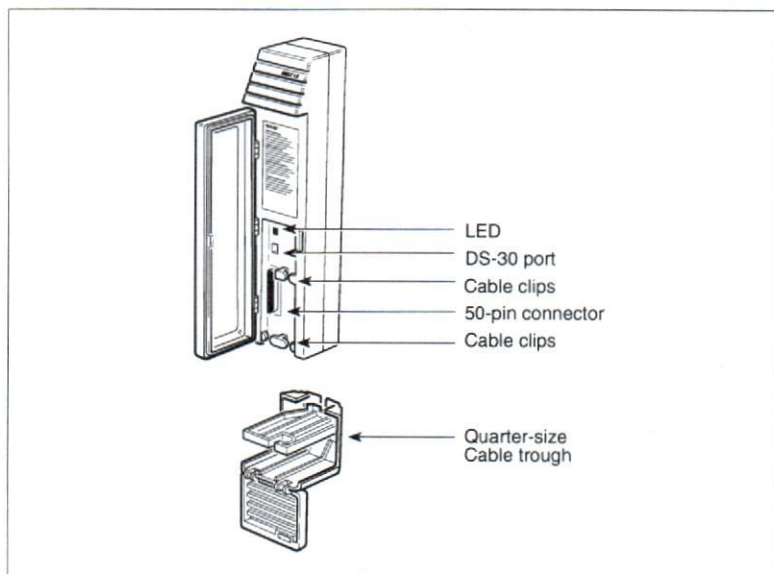
Trunk Module (TM)

The Trunk Module allows additional Trunk Cartridge installation. This in turn allows more external lines to be connected to the Norstar system. The Trunk Module has three slots in front for inserting Trunk Cartridges. Each Trunk Module can add a maximum of 12 external lines (four external lines per Trunk Cartridge). Different types of Trunk Cartridges can be mixed in one Trunk Module. When mixing Trunk Cartridges, use a separate distribution block for each type of Trunk Cartridge.



Station Module (SM)

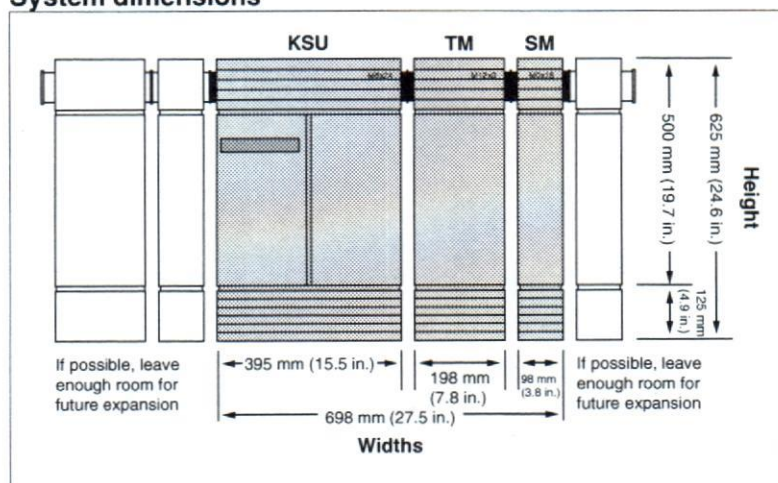
The Station Module allows up to 16 additional Norstar telephones to be connected to the system. A DS-30 cable connects each Station Module to the KSU.



Recommended layout

The Key Service Unit (KSU), Trunk Modules (TM), and Station Modules (SM) can be mounted in any order. Allow suitable wall space for installing future Trunk and Station Modules.

System dimensions



Additional dimensions of Norstar KSU, TM & SM

Dimension	KSU	TM	SM
Depth	171 mm (6.7 in)	171 mm (6.7 in)	171 mm (6.7 in)
Clearance (front)	346 mm (13.6 in)	346 mm (13.6 in)	245 mm (9.6 in)
Weight (excluding cables and cartridges)	7.5 Kg (16.6 lb)	4.3 Kg (9.5 lb)	2.4 Kg (5.3 lb)

Remember

Top

Leave about 15 centimetres (6 inches) of space above the screw holes of the mounting bracket. This allows room to slide the KSU, Trunk Module and Station Module on and off the bracket and provides space for venting the heat from the modules.

Bottom

Ensure there is at least 10 centimetres (4 inches) of space between the bottom of the cable trough and the floor, or any object that may block the flow of air from the bottom for cooling.

CAUTION

All modules must be mounted well above the floor to prevent water damage.

Sides

Mount the distribution block on the left side of the KSU. Leave enough room to mount additional Trunk Modules and Station Modules on the right side.

Front

Leave enough room to allow the doors of the modules to open and the cabling to run on the side.

Between modules

The space between two modules hung on the mounting brackets is approximately 3 mm ($\frac{1}{8}$ in).

Note: Refer to the illustration showing the system dimensions for additional module clearance requirements.

CAUTION

Mount the KSU vertically to avoid overheating.

System hardware configuration

This chart shows combinations of Trunk Modules, Trunk Cartridges, and Station Modules for expanding the system.

Possible line and station configurations

TM	TC	SM						
		0	1	2	3	4	5	6
0	0	8-24	8-40	8-56	8-72	8-88	8-104	8-120
1	1	12-24	12-40	12-56	12-72	12-88	12-104	
	2	16-24	16-40	16-56	16-72	16-88	16-104	
	3	20-24	20-40	20-56	20-72	20-88	20-104	
2	4	24-24	24-40	24-56	24-72	24-88		
	5	28-24	28-40	28-56	28-72	28-88		
	6	32-24	32-40	32-56	32-72	32-88		
3	7	36-24	36-40	36-56	36-72			
	8	40-24	40-40	40-56	40-72			
	9	44-24	44-40	44-56	44-72			
4	10	48-24	48-40	48-56				
	11	52-24	52-40	52-56				
	12	56-24	56-40	56-56				
5	13	60-24	60-40					
	14	64-24	64-40					
	15	68-24	68-40					
6	16	72-24						
	17	76-24						
	18	80-24						

Note: Number of physical lines shown is for Loop Start, DID, and CI Trunk Cartridges only. E&M/DISA Trunk Cartridges provide half the number of lines.

How to read the hardware chart

To find the maximum number of lines and telephones for a particular configuration of KSU, Trunk Module(s), and Station Module(s):

1. Find the number of Trunk Modules in the left column. The column labeled "TC" gives the number of Trunk Cartridges.
2. Find the number of Station Modules in the top row.
3. Read across to the right from the Trunk Module column and down from the Station Module row.

A pair of numbers indicates lines and telephones for that combination of Trunk Modules and Station Modules. The left number is the maximum number of external lines. The right number is the maximum number of telephones.

Examples:

8-24	=	8 lines and 24 telephones (KSU without Trunk Modules or Station Modules).
------	---	---

12-24	=	12 lines and 24 telephones (KSU lines and telephones, plus one Trunk Module and one Trunk Cartridge with 4 more lines, and no Station Modules).
-------	---	---

12-40	=	12 lines and 40 telephones (KSU lines and telephones, plus one Trunk Module and one Trunk Cartridge with 4 more lines, and one Station Module with 16 more telephones).
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Mounting a module

1. Position metal mounting bracket(s) on the wall or on the backboard. Fasten the brackets with 19-mm ($\frac{3}{4}$ in) screws.

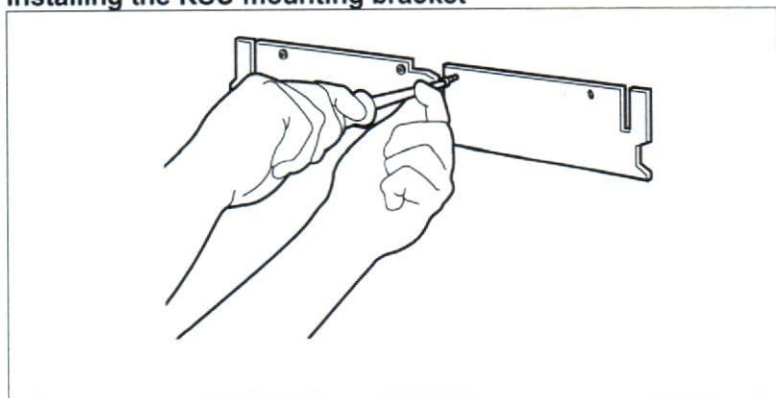
Hint: Before positioning the mounting brackets, draw a line using a level and a pencil. This will help align the modules.

2. Slide the KSU, Trunk Module, or Station Module down onto the mounting brackets. Line up with the notches on either side of the mounting bracket as you slide the module onto the mounting bracket(s). This facilitates accurate hanging.
3. Slide the cable trough(s) up under the appropriate module(s).

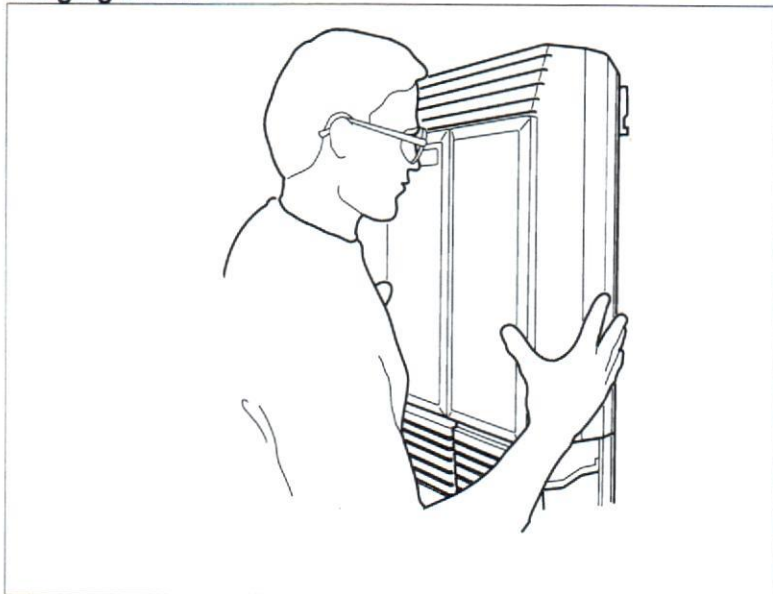
The KSU requires two half-size cable troughs. A Trunk Module uses one half-size cable trough, while a Station Module uses a quarter-size cable trough.

4. Open each cable trough door and let the door swing open.
5. Fasten the cable trough to the wall with 25-mm long screws. Each cable trough requires two screws through the holes provided in the lower tray of the cable trough.
6. Close the doors of the cable troughs.
7. Do **not** connect power at this point.

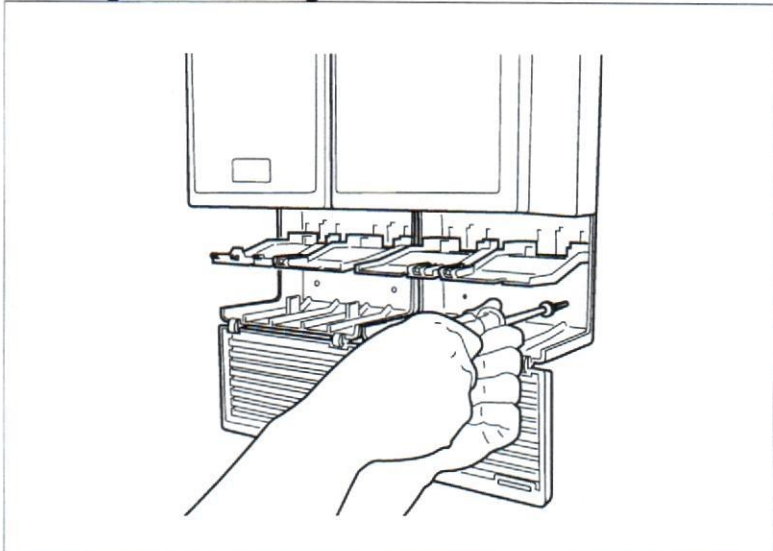
Installing the KSU mounting bracket



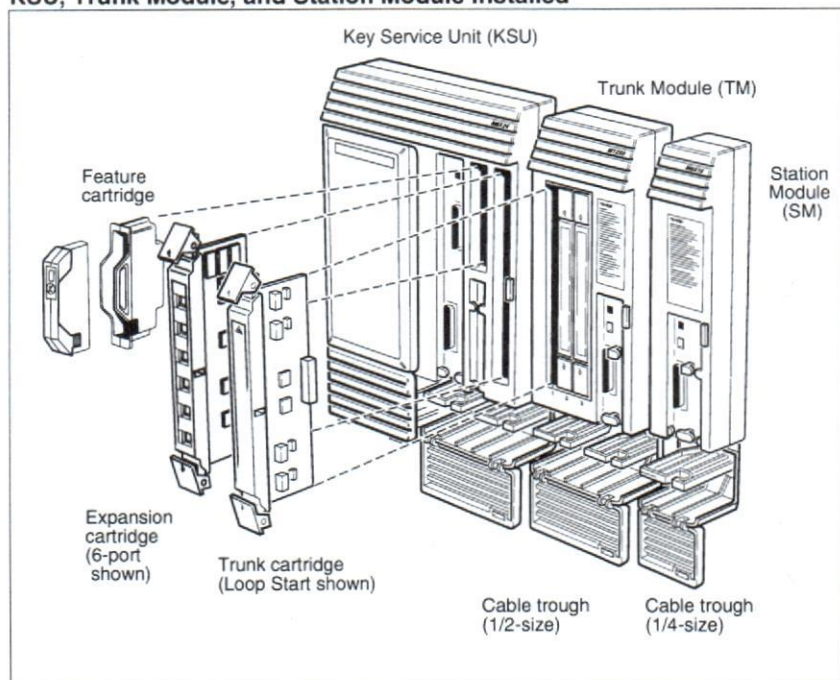
Hanging the KSU



Installing the cable troughs



KSU, Trunk Module, and Station Module installed



Note: For clarity, the illustration shows a KSU, a Trunk Module, and an Station Module without doors. The doors should not be removed during installation or operation. Also shown are the Feature, Expansion, and Trunk Cartridges which are installed later.

Installing the Feature Cartridge

The Feature Cartridge is made up of a Software Cartridge and a Data Cartridge. The Software Cartridge contains the system programming. The Data Cartridge contains the data from Configuration and Administration programming.

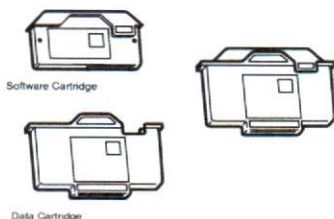
When there is a software upgrade, only the Software Cartridge, and not the Data Cartridge, needs to be replaced.

CAUTION

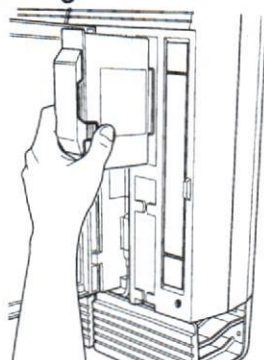
Do not touch the printed circuit board inside the cartridge casing. This is an electrostatic-sensitive device.

1. Turn the KSU power OFF before installing or removing a Feature Cartridge.
2. Make sure you are wearing a grounding strap when handling Norstar cartridges.
3. Insert the Software Cartridge into the Data Cartridge.
4. Insert the Feature Cartridge assembly into the KSU.

Unassembled and assembled Feature Cartridges



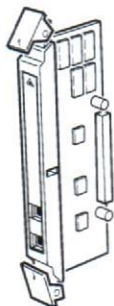
Installing the Feature Cartridge



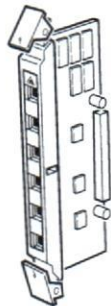
Installing an Expansion Cartridge

The two-port Expansion Cartridge allows up to two additional modules (Trunk Modules and/or Station Modules) to be connected to the system. The six-port Expansion Cartridge allows the connection of up to six additional Trunk or Station Modules. This Cartridge fits into the right slot of the Key Service Unit (KSU).

Two-port Expansion cartridge



Six-port Expansion cartridge



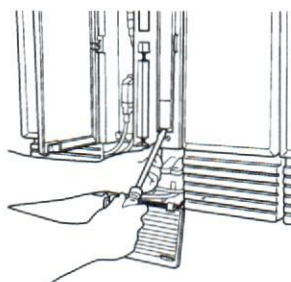
The procedures for installing the Two-port and Six-port Expansion Cartridges are identical. (Refer to the Port Numbering information in this Guide for changes to default internal number length caused by installing an Expansion Cartridge.)

CAUTION

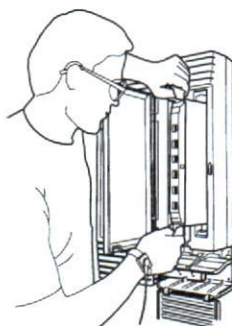
Do not touch the printed circuit board on the Expansion Cartridge. This is an electrostatic-sensitive device.

1. Make sure that the KSU power is OFF before installing or removing an Expansion Cartridge.

2. Remove the cover of the Expansion Cartridge slot in the KSU. Use a screwdriver at the bottom of the cartridge slot cover to help detach the cartridge slot cover from the slot.



3. Make sure you are wearing a grounding strap when handling any cartridge.
4. While holding the latches open, insert the Expansion Cartridge in the appropriate slot and close the latches at the same time to align the cartridge properly.



Installing a Trunk Cartridge

The Trunk Cartridge, when inserted in a Trunk Module, adds up to four external lines to the Norstar system. A maximum of three Trunk Cartridges can be installed in each Trunk Module.

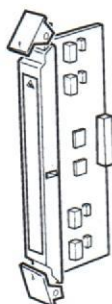
There are four types of Trunk Cartridges:

- the Loop Start Trunk Cartridge (4 lines)
- the E&M/DISA Trunk Cartridge (2 lines)
- the DID Trunk Cartridge (4 lines)
- the CI Trunk Cartridge (4 lines)

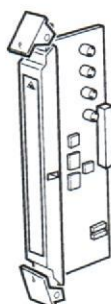
The Loop Start Trunk Cartridge supports regular external lines. The E&M/DISA Trunk Cartridge connects Norstar to a private network. The DID Trunk Cartridge supports direct inward dialing on incoming external lines. The CI Trunk Cartridge supports Call Display features on external lines.

Trunk Cartridges

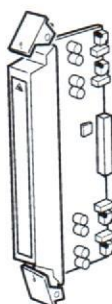
Loop Start



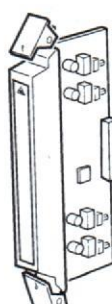
E&M/DISA



DID



CI



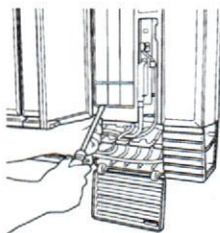
Different Trunk Cartridges can be installed in one Trunk Module if required for a particular installation. When mixing Trunk Cartridges, use a separate distribution block for each type of Trunk Cartridge.

The procedures for installing the different Trunk Cartridges are identical. See the wiring charts in this Guide for details.

CAUTION

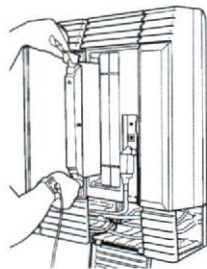
Do not touch the printed circuit board on the Trunk Cartridge. This is an electrostatic-sensitive device.

1. Make sure that the Trunk Module power is OFF before installing or removing a Trunk Cartridge.
2. Remove the appropriate cartridge slot cover of an unused Trunk Cartridge slot on the Trunk Module. Use a screwdriver at the bottom of the cartridge slot cover to detach the cover from a Trunk Cartridge slot.



Note: The numbers on the cartridge slots indicate the order that the cartridges should be installed. If an E&M/DISA or a DID Trunk Cartridge is installed in slot 1, Emergency telephones cannot be supported.

3. Make sure you are wearing a grounding strap when handling Norstar cartridges.
4. While holding the latches open, insert the Trunk Cartridge in the appropriate slot and close the latches at the same time to align the cartridge properly.



Upgrading the Software Cartridge

Before installing a Modular DR5 CI Trunk Cartridge or Call Identification Interface (CII), the KSU system Software Cartridge must be upgraded to DR5.

There are two possible situations where a software upgrade is necessary:

1. upgrading from a DR2 Software Cartridge, or
2. upgrading from either a DR3 or a DR4 Software Cartridge.

Upgrading from DR2

If you are upgrading from a DR2 Software Cartridge, you must first upgrade to DR3 software.

When a DR3 Feature Cartridge is plugged into a DR2 KSU, an automatic upgrade takes place. In order to allow remote programming of the NVRAM and prevent the automatic upgrade, the following should be done:

1. Insert the Software Cartridge into the Data Cartridge prior to installing in the system.
2. Place the new DR3 Feature Cartridge assembly into a captive KSU with the appropriate Two-port or Six-port Expansion Cartridge, and power up the system.
3. Perform the Administration programming appropriate for the customer's site. This will maintain their DR2 programming.
4. Change the Time and Date (either the hour or minutes, or both). This sets a lock on the NVRAM data so that it cannot be updated.
5. Power down the captive KSU, remove the DR3 Feature Cartridge and take it to the customer site. To return a DR3 Feature Cartridge to the state where an automatic upgrade will occur, perform ** Startup on it while it is in the captive KSU.

Continue with the following procedure to install the DR3 Feature Cartridge assembly in the customer's KSU.

1. Make sure that the KSU power is OFF before installing or removing the DR3 Feature Cartridge assembly.
2. Make sure you are wearing a grounding strap when handling a cartridge.
3. Insert the DR3 Feature Cartridge assembly into the KSU.

Once you have completed the upgrade to DR3 you can continue with the next procedure to upgrade from DR3 to DR5 software.

Upgrading from DR3 or DR4

1. Ensure that there is no call activity by informing all Norstar users that the system will briefly be out of operation.
2. Turn OFF the KSU power (unplug the power cord).
3. While wearing a grounding strap, remove the Feature Cartridge from the KSU.
4. Remove the Software Cartridge from the Data Cartridge.
5. Insert the new Software Cartridge into the Data Cartridge.
6. Insert the new Feature Cartridge into the KSU.
7. Turn ON the KSU power (plug in the power cord).

Wiring

Cable routing in the cable trough

Cable troughs beneath the KSU, Trunk Module, and Station Module hold the 25-pair cables, the DS-30 cables, the power cord(s), and the Power Bar (if required).

The cable troughs have been designed to keep the ac power cords and Power Bar separate from the connecting cables and to allow ease of access. Place the cabling in the two shelves, as described in the following chart and pages.

Upper shelf	All 25-pair cables and DS-30 cables: Place 25-pair cables in the back. Place the DS-30 cables in the front.
Lower shelf	All power cords and the Power Bar(s).

WARNING

To avoid electrical shock, hazard to personnel, or equipment damage, observe the following precautions when installing telephone equipment:

- Never install telephone wiring during a lightning storm.
- Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.
- Never touch non-insulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.

Connecting internal wiring

To connect the internal telephones, each KSU and Station Module requires one 25-pair, 0.5-mm (24-AWG) cable with a female 50-pin connector at one end. Enough 50-pin distribution blocks are required to accommodate the internal wiring.

1. Plug the 50-pin connector of a 25-pair cable into the station connector on the KSU or the Station Module. (The connector is labeled with an icon representing a telephone.)



2. Route the cable(s) through the upper shelf of the cable troughs to the distribution block.

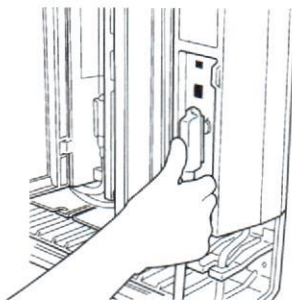
Note: Route the cables straight out to one side of the cable trough in a bundle. Use cable ties to secure them to the wall and to support their weight.

3. Connect the wires to the appropriate pins on the distribution block. (Refer to the wiring charts in this Guide.)
4. Cross-connect the KSU and Station Module telephone wires to the corresponding station pins on the distribution block. (Refer to the wiring charts in this Guide.)
5. Using a single pair of wires for each telephone, connect each of the telephones according to the wiring charts.

Connecting to the KSU



Connecting to the Station Module



Connecting external lines

To connect the external lines and auxiliary equipment, each KSU and Trunk Module requires one 25-pair, 0.5-mm (24-AWG) cable terminated with a female 50-pin connector on one end. A distribution block is required for each 25-pair cable.

1. Plug the 50-pin connector of a 25-pair cable into the external line connector on the KSU or the Trunk Module. (The connector is labeled with an icon representing telephone poles.)



2. Route the cable(s) through the upper shelf of the cable trough to the distribution block.

Note: Route the cables straight out to one side of the cable trough in a bundle. Use cable ties to secure them to the wall and to support their weight.

3. Cross-connect the external lines to the distribution block. (Refer to the KSU and Trunk Module external line wiring charts and wiring arrangement diagrams in this Guide.)
4. Connect the auxiliary equipment lines to the distribution block. (Refer to KSU and Trunk Module external line wiring charts and wiring arrangement diagrams in this Guide.)

Note: Auxiliary equipment cannot be connected to the RJ-21 interface.

5. Connect external lines to a standard RJ-21 interface:

Bring the external cable to the distribution block and use the distribution block to cross-connect to the corresponding KSU and Trunk Module external lines according to the KSU and Trunk Module external line wiring charts and diagrams. Refer to the following charts and illustrations in this Guide:

- Wiring arrangement for Norstar KSU
- Wiring arrangement for Norstar Trunk Module
- KSU external lines and auxiliary equipment wiring
- Loop Start/CI Trunk Cartridge wiring chart

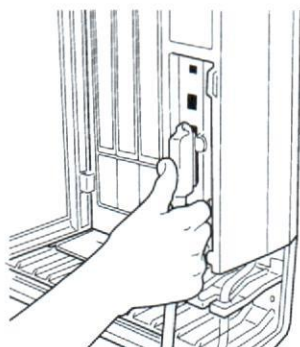
6. Wire the auxiliary equipment lines separately. (Refer to the KSU and Trunk Module external line wiring charts and diagrams.)

Note: For the Trunk Module, the auxiliary equipment line is an Emergency Telephone (ET).

Connecting the KSU external lines



Connecting the Trunk Module external lines

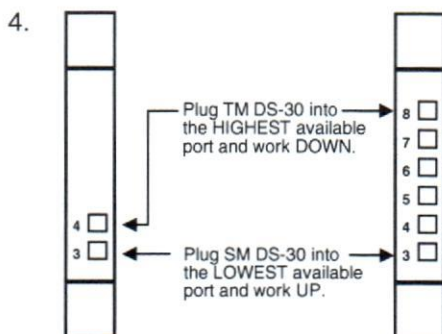


Norstar as an OPX

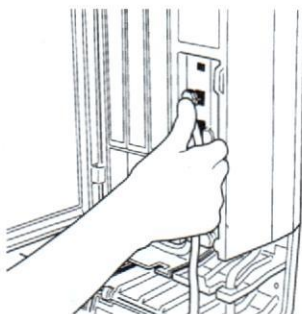
Norstar can be used as an off premise extension (OPX) from a PBX. In order to support this application, the OPX lines must be engineered not to exceed 7 dB total loop loss from the serving central office to the demarcation point at the Norstar KSU.

Connecting DS-30 cables

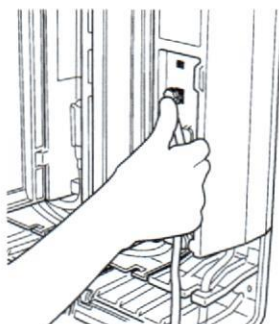
1. Plug one end of the DS-30 cable into the DS-30 port on the front of a Trunk Module or Station Module.
2. Route the cable through the cable clips on the right side of the Trunk Module or Station Module.
3. Route the cable through the upper shelf of the cable trough to the KSU and up through the cable clip to the Expansion Cartridge.



Plugging in a Trunk Module DS-30 cable



Plugging in a Station Module DS-30 cable



Emergency telephones

Emergency telephones (ET) are standard (500/2500) single-line telephones that provide emergency service in case of power failure or when power to the Norstar system is disconnected.

The KSU has two emergency telephone connections. Each Trunk Module has one emergency telephone connection.

Connecting emergency telephones

The procedure is the same for connecting emergency telephones to the distribution block for a KSU or a Trunk Module.

1. Wire a modular jack or equivalent to each set of emergency telephone pins on the 50-pin distribution block for KSU or Trunk Module external lines.

The connections on the distribution block for emergency telephones appear in the wiring charts in this Guide.

Note: The emergency telephone connections will not work if there is an E&M/DISA or DID Trunk Cartridge in the first slot of the Trunk Module.

2. Connect a single-line telephone to the modular jack.

Testing the emergency telephones

The emergency telephones must be tested with the power OFF at the KSU and Trunk Module.

1. Pick up the receiver of the emergency telephone.
2. Listen for the dial tone.

If you hear a dial tone, both the emergency telephone and the line are functioning properly.

If you hear no dial tone:

- Verify that power to the KSU and Trunk Module(s) is OFF.
 - Check that the external line and emergency telephone connections have been made correctly.
 - Ensure that the emergency telephone is not faulty, by connecting it directly to the external line and listening for dial tone.
 - Verify that there is dial tone on lines 1 and 2 of the KSU and on line 1 of the Trunk Module.
3. If all previous steps have been verified and there is still no dial tone at the emergency telephone, replace the KSU if the emergency telephone is connected to the KSU, or replace the Trunk Module if the emergency telephone is connected to the Trunk Module.

Norstar telephones

WARNING

Norstar telephones cannot be used as off-premise extensions (OPX). For OPX applications, use the Norstar Analog Terminal Adapter (ATA) and a single line telephone. (See the ATA installation card for details.)

Installing Norstar Telephones

1. Connect the receiver cord to the telephone modular jack indicated by the following symbol, then route the cord through the appropriate cord guide in the base of the telephone.



2. Connect the line cord to the telephone jack indicated by the following symbol, then route the cord through the appropriate cord guide.



3. Plug the other end of the line cord into the modular jack wired from the distribution block.
4. When the telephone is connected to the KSU or Station Module, the telephone display and indicators flash briefly while the telephone initializes (when the Norstar System is powered up). The telephone is fully operational when the display shows the default time and date.
For example: Jan 1 1:00 am.

Note: If the telephone line is supported with auxiliary power, the power source must be a Class 2 device that is UL and CSA listed.

Wall-mounting a telephone

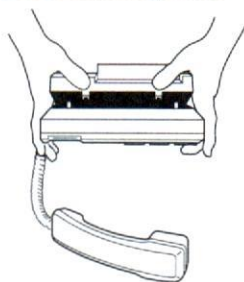
Norstar telephones can be mounted on the wall.

1. Remove the beveled wall-mounting base from the back of the telephone. Grip the telephone, and with your thumbs, push on the wide edge of the base to pop it out from the telephone.
2. Remove the receiver clip from the wall-mounting base. Install the clip in the forward lip of the receiver rest.
3. Use a screwdriver or similar tool to remove the center knock-out panel in the wall-mounting base.
4. Screw the base to the wall (thin end up) so that the wall jack projects through the knock-out.
5. Connect one end of the line cord to the telephone line jack (indicated by the symbol below).



6. Route the line cord through the appropriate cord guide in the bottom of the telephone.
7. Connect the other end of the line cord to the wall jack. Store any spare cord neatly in the base of the telephone and mount the telephone on the base.

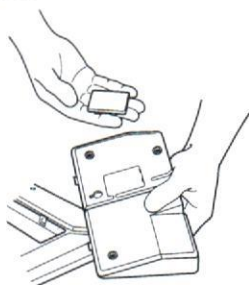
**Removing the
wall-mounting base**



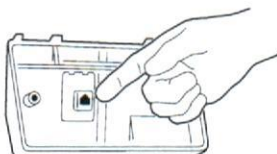
Installing the receiver clip



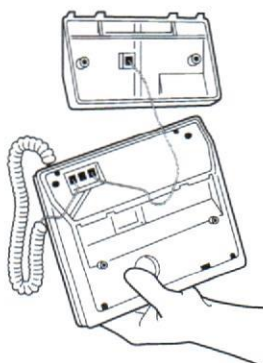
**Removing the knock-out
panel**



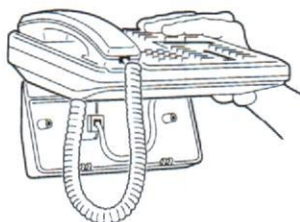
**Installing the
wall-mounting base**



Connecting the line cord



Mounting the telephone



Applying the button cap labels

Before you apply button labels, activate the Button Inquiry feature (*) to verify the buttons' programmed functions, and to avoid activating features as you put the labels onto the buttons.

There are two types of button labels: printed and blank. Keep the extra labels and button caps with each Norstar telephone or leave them with the System Coordinator.

Types of button caps

- **Unlabeled, clear button caps**
with appropriate green or grey paper for typing in line numbers, telephone numbers, and features
- **Pre-printed, colored button caps**
in green or grey

Some example pre-printed button caps

Green caps	Grey caps
Line 1	Last No.
Handsfree	Speed Dial

Note: To make identification of line types easier, use preprinted green button caps for lines that support incoming and outgoing calls. Use clear button caps for target lines that are incoming only.

Identifying the telephones

1. Write the individual telephone numbers on the labels and attach them to the appropriate Norstar telephones.
2. Write the telephone number and the internal number on the appropriate *Norstar Receiver Card* for each type and color of telephone that is to be installed.
3. Cover the *Norstar Receiver Card* underneath the receiver of each telephone with the plastic lens.

Norstar default button assignments

During Startup, the Installer chooses one of four default templates: Square, Centrex, Hybrid, or PBX. Default features are assigned automatically to the programmable buttons on Norstar telephones, and vary with the template and the telephone. The default features are listed in the tables in this chapter.

Note: Norstar telephones are shipped from the factory with the button caps in place for the Square template.

Rules of default button assignment

Line and Intercom buttons are assigned by default templates and can be changed in Configuration programming. Handsfree/Mute and Answer buttons are not assigned by default. If these features are defined, however, they are automatically assigned to specific buttons, as described on this and the following page. None of these buttons can be assigned to M7100 Telephones.

Handsfree/Mute

This feature appears on the bottom right-hand button (the bottom button on the M7208 Telephone), moving the Intercom button(s) up one position.

Intercom

Each telephone can have up to eight Intercom buttons. They appear above the Handsfree/Mute button at the bottom right-hand position on your telephone (the bottom button on the M7208 Telephone).

Answer

Each telephone can have up to four Answer buttons. They appear above Intercom buttons in the right column and continue up from the bottom in the left column, replacing the features on those buttons. (On the M7208 Telephone, Answer buttons appear above Intercom buttons and below external line buttons in a single column.)

External line

External line buttons appear in ascending line order, starting at the top button in the left column (the top button on the M7208 Telephone). If more than five external lines are assigned to an M7310 Telephone, or more than 12 to an M7324 Telephone, assignment continues down the buttons on the right column, erasing the features on those buttons. Line buttons have priority over feature access buttons but not Handsfree/Mute, Intercom, or Answer buttons.

Telephone button defaults

Each column—Square, Centrex, Hybrid, and PBX—shows the defaults specific to these templates.

M7100 Telephone

For Square, Centrex, Hybrid, and PBX templates, the one programmable button on the M7100 Telephone is .

M7208 Telephone

The default button assignments for the M7208 Telephone depend on the template applied.

Square	Centrex	Hybrid	PBX
Line 1	Line<xx>	Line 1	Pick-Up
Line 2	Transfer	Line pool	Transfer
Last No.	Last No.	Last No.	Last No.
Page	Link	Page	Page
Conf/Trans	Conf/Trans	Conf/Trans	Conf/Trans
Speed Dial	Speed Dial	Speed Dial	Speed Dial
Intercom	Intercom	Intercom	Intercom
Intercom	Intercom	Intercom	Intercom

Note: The default Page button activates the External Page option ().

M7310 Telephone

The default button assignments for the M7310 Telephone depend on the template applied. The exception is the default numbering for the dual-memory buttons.

Dual-memory buttons

Set 233	Set 237	Set 241
Set 221	Set 225	Set 229
Set 234	Set 238	Set 242
Set 222	Set 226	Set 230
Set 235	Set 239	Set 243
Set 223	Set 227	Set 231
Set 236	Set 240	Set 244
Set 224	Set 228	Set 232

This example shows defaults for a system with three-digit internal numbers.

These defaults do not actually exist on any telephone, as no telephone has an Autodial button for itself. The position that would be taken by the Autodial button for itself, is blank.

Template button assignments

Square		Centrex	
Line 1	Conf/Trans	Line<xx>	Conf/Trans
Line 2	Last No.	Transfer	Last No.
Call Fwd	Voice Call	Call Fwd	Voice Call
Pick-Up	Intercom	Pick-Up	Intercom
Page	Intercom	Link	Intercom

Hybrid		PBX	
Line 1	Conf/Trans	DND	Conf/Trans
Line pool	Last No.	Transfer	Last No.
Call Fwd	Voice Call	Call Fwd	Voice Call
Pick-Up	Intercom	Pick-Up	Intercom
Page	Intercom	Page	Intercom

M7324 Telephone

The default button assignments for the M7324 Telephone depend on the template applied.

Square		Centrex	
Line 1	Call Fwd	Line<xx>	Call Fwd
Line 2	Speed Dial	blank	Speed Dial
blank	Last No.	blank	Last No.
blank	Saved No.	blank	Link
blank	Conf/Trans	blank	Conf/Trans
blank	Transfer	blank	Transfer
blank	DND	blank	DND
blank	Pick-Up	blank	Pick-Up
blank	Voice Call	blank	Voice Call
blank	Page	blank	Page
blank	Intercom	blank	Intercom
blank	Intercom	blank	Intercom

Hybrid		PBX	
Line 1	Call Fwd	blank	Call Fwd
Line pool	Speed Dial	blank	Speed Dial
blank	Last No.	blank	Last No.
blank	Saved No.	blank	Saved No.
blank	Conf/Trans	blank	Conf/Trans
blank	Transfer	blank	Transfer
blank	DND	blank	DND
blank	Pick-Up	blank	Pick-Up
blank	Voice Call	blank	Voice Call
blank	Page	blank	Page
blank	Intercom	blank	Intercom
blank	Intercom	blank	Intercom

Optional equipment

Auxiliary ringer (Customer Supplied)

The Norstar KSU provides a control contact to operate an external ringer. The auxiliary ringer can be activated by setting auxiliary ring for specific external lines, and auxiliary ring for specific telephones.

Refer to the chapters on programming for more details. Refer specifically to the following headings in Administration and Configuration.

Heading	Programmed in:
Trk/Line Data	Configuration
Capabilities	Administration
Service Modes	Administration

1. Follow the manufacturer's installation instructions.
2. Connect the Auxiliary Ring Generator to the 50-pin distribution block as shown in the wiring charts in this Guide.

The pins in this chart provide a control contact. They do not provide ring current or dc voltage. The ringer must not draw more than 50 mA from a 40-V dc source.

External music source (Customer Supplied)

Music for callers on Hold and for Background Music must be enabled through programming. Refer to the Programming chapter for more details. Refer specifically to the following programming headings in Configuration and confirm that the following settings are implemented:

Heading	Setting
Call Handling	On Hold: Music
Miscellaneous	Background Music: Yes

External music source programming

The music source can be any approved low-power device such as a radio with a high-impedance earphone jack. The recommended KSU input level is 1 V rms across an input impedance of 3300 Ω .

1. Connect the music source and ground to the 50-pin distribution block, as shown in the internal wiring charts in this Guide.

CAUTION

To avoid damage to audio equipment, ensure that the polarity of the audio input is correct according to the KSU internal wiring connector chart.

2. Adjust the volume of the music source to a comfortable level by activating Music on Hold or Background Music and adjusting the volume at the music source.

Note: Background Music volume can also be adjusted at each telephone.

Installing an external paging system

The paging system uses the speakers on Norstar telephones and can also be used with external loudspeakers provided by the customer. The paging output from the Norstar KSU is 775 mV rms across an input impedance of 600 Ω .

1. Follow the manufacturer's installation instructions.
2. Connect the paging system audio input to the 50-pin distribution block as shown in the internal wiring charts in this Guide.
3. Connect the paging system relay to the 50-pin distribution block as shown in the internal wiring charts.

Note: Norstar system external paging does not support talk-back paging equipment unless an external line port is used.

In addition, the Norstar KSU provides a relay contact that can be used for other applications (for example, switching music ON or OFF).

External paging contacts

idle



active



The Norstar KSU provides both a "make" (normally open) and a "break" (normally closed) set of contacts that operate in conjunction with the External Page feature. These contacts can be used to control various external devices. The external device being connected through these contacts must not draw more than 50 mA from a 40-V dc source.

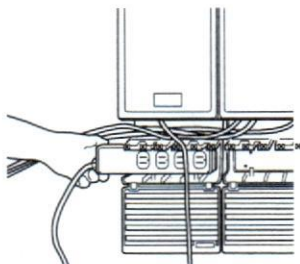
Power Bar installation

CAUTION

For 110-V systems, use only a CSA certified and UL listed Power Bar having a third wire ground.

For 220-V systems, use only an approved Norstar 220-V Power Bar having a third wire ground.

1. Slide the Power Bar into the lower shelf of the cable trough. All power cords must go only in the lower shelf.



Where any combination of four or more Trunk or Station Modules is present, use a second Power Bar to provide additional plugs. On a 110-V system, the power cord from the second Power Bar must be plugged into the first Power Bar. On a 220-V system, the Power Bars are connected with a separate power cord.

2. Route the power cord from the KSU, Trunk Module, and Station Module through the cable clips located in the lower shelf of the cable trough.
3. Plug the KSU, Trunk Module, and Station Module power cords into the Power Bar(s).
4. If you have a 220-V system, plug the ac power cord into the Power Bar.

Power up the Norstar system

1. Double check all wiring before turning the system power ON.
2. Connect to the outlet (a non-switchable, third-wire ground ac outlet):

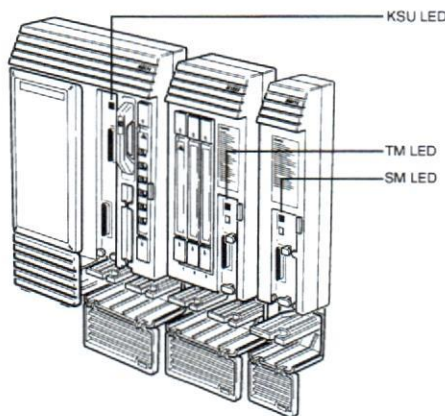
For a 110-V system:

If a Power Bar is used, plug the Power Bar into the ac outlet. Otherwise, plug the KSU power cord into the ac outlet.

For a 220-V system:

If a Power Bar is used, plug the Power Bar into the separate ac power cord. This ac power cord plugs into the ac outlet. Otherwise, plug the KSU power cord into the ac power cord. This ac power cord plugs into the ac outlet.

3. Check that the red power LEDs are ON. (The KSU, Trunk Module, and Station Module each have one LED.)



4. If none of the LEDs are ON, check the power at the ac outlet.
 - If there is no power, check with building maintenance.

OR

 - If there is ac power at the outlet, replace the module(s) that do not have a red LED ON.

Telephone relocation and replacement

Automatic Telephone Relocation and telephone replacement are features associated with moving and replacing Norstar telephones in the system. The basic difference is that relocation allows a moved telephone to retain its programming, and replacement re-assigns or removes programming.

Automatic Telephone Relocation

Automatic Telephone Relocation is disabled by default. For Automatic Telephone Relocation to work, the system power must be ON and the Automatic Telephone Relocation feature must be activated in Configuration programming.

A telephone can be moved to a new location within the Norstar system without losing its programmed settings. The internal numbers, Autodial settings, and Personal Speed Dial codes remain with the telephone when it is unplugged. To move a telephone, simply unplug it and plug it in again at another location. Recognition of the telephone by the KSU may take up to 45 seconds.

Notes: All Norstar telephones being moved should be relocated before new telephones are plugged into their place. This allows the moved telephones to retain their programmed settings. If a new telephone is plugged into the Norstar system before the old telephone is reconnected at a new location, Norstar will give the old telephone's information to the new telephone, and the old telephone will no longer be recognized by the system. (Refer to Telephone replacement, below.)

When changing a telephone's internal number (in Configuration programming), wait one minute after Automatic Telephone Relocation.

Telephone replacement

In a powered-up system, an existing Norstar telephone can be replaced by a new Norstar telephone. A new Norstar telephone is one that was not previously in service within the system.

Replacing Norstar telephones of the same type

If an existing Norstar telephone is unplugged, and a new Norstar telephone of the same type is then plugged into the same jack (for example, replacing an M7208 Telephone with another M7208 Telephone), the new telephone acquires the programming and the internal number of the old telephone. This is normally done to replace a defective telephone.

Replacing Norstar telephones of different types

If an existing Norstar telephone is unplugged, and a new Norstar telephone of a different type is plugged into the same jack (for example, replacing an M7208 Telephone with an M7310 Telephone), the new telephone keeps the old internal number. The new telephone receives a default profile for a telephone of its type. (Refer to the button defaults listed in the section on Norstar telephones and system defaults listed in the Programming chapter).

Note: If the telephone being replaced has more lines than the new telephone, automatic outgoing line selection may not work with the Handsfree/Mute feature. A line must be selected manually.

Status of a telephone that was replaced

The old Norstar telephone that was unplugged, and replaced by a new Norstar telephone, loses its programming and internal number. The old telephone's internal number has been given to the new telephone and the programming has either been removed or given to the new telephone when it was plugged into the old jack. The replaced telephone (if still functional) is now treated by the system as a telephone not previously in service.

Regulations

Radio Frequency Interference

WARNING

This equipment generates, uses, and can radiate radio frequency energy. If not installed and used in accordance with the instruction manual, it may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Part 15 of the FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user, at his own expense, will be required to take whatever measures may be required to correct the interference. Each Norstar Key Telephone System is assigned an FCC Registration Number and a Ringer Equivalence designation. The number and designation are printed on the Key Service Unit (KSU) label on the front of the unit inside the door.

Registration

The Norstar Key Telephone System is registered with the FCC based upon compliance with Part 68 of its rules. Connection of the Norstar Key Telephone System to the nationwide telecommunications network is made through a standard network interface jack that you can order from your telephone company. Jacks for this type of customer-provided equipment will not be provided on party lines or coin lines.

Interconnect

Norstar Modular equipment meets all applicable requirements of both the Canadian Department of Communications CS-03 and US Federal Commission FCC part 68 and has been registered under files DOC 3322492A and FCC AB67UJ-17156-KF-E (key system) and AB67UJ-17338-MF-E (hybrid system).

Ringer Equivalence Number (REN)

The FCC Registration Label, on the inside of the door on the front of the Key Service Unit (KSU), includes the Ringer Equivalence Number (REN). This number shows the electrical load that your Norstar KSU requires from your telephone line. If the KSU requires more electrical current than your telephone company's central office equipment can provide, your telephones may not ring and you may have difficulty dialing telephone numbers.

Call the telephone company to find out the total REN allowed for your telephone line(s).

Hearing Aid Compatibility

Norstar telephones are Hearing Aid compatible, as defined in Section 68.316 of Part 68 FCC Rules.

Electromagnetic compatibility (EMC)

Radiated emissions

Norstar Modular equipment meets all FCC part 15, class A radiated emissions requirements.

Conducted emissions

Norstar Modular equipment meets all FCC part 15, class A conducted emissions requirements.

Safety

Norstar Modular equipment meets all applicable requirements of both the Canadian Standards Association C22.2 No. 234 M1989 and US Underwriter's Laboratory UL-1459, and UL-1950, and has been registered under files CSA LR58855-12 and UL E115515 88NK16650.

Telephone Company Registration

It is usually not necessary to call the telephone company with information on the equipment before connecting the Norstar Key Telephone System Key Service Unit (KSU) to the telephone network but, if the telephone company requires this information, provide the following:

- Telephone number(s) to which the Key Service Unit (KSU) will be connected.
- FCC Registration Number (on label affixed to KSU, inside the door).
- Ringer Equivalence Number (on label affixed to KSU, inside the door).
- USOC Jack
RJ-21X (RJ2HX for E&M/DISA service)
- Service Order Code (SOC) 9.0 F
- Facility Interface Code
(FIC)02LS2 (TL32M for E&M/DISA service)

Use of a Music source

In accordance with U.S. Copyright Law, a license may be required from the American Society of Composers, Authors and Publishers, or similar organization if Radio or TV broadcasts are transmitted through the Music On Hold or Background Music features of this telecommunication system.

Northern Telecom Inc. hereby disclaims any liability arising out of the failure to obtain such a license.

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Rights of the Telephone Company

If the system is determined to be causing harm to the telephone network, the telephone company may discontinue your service temporarily. If possible, the telephone company will notify you in advance. If advance notice is not practical, you will be notified as soon as possible. You will be given the opportunity to correct the situation and you will be informed of your right to file a complaint to the FCC. Your telephone company may make changes in its facilities, equipment, operations or procedures that could affect the proper functioning of your system. If it does this, you will be notified in advance to give you the opportunity to maintain uninterrupted telephone service.

In the event of an equipment malfunction, all repairs will be performed by Northern Telecom Inc. or by one of its authorized dealers.

Address of a repair facility

USA

Northern Telecom Inc.
Product Service Center
640 Massman Drive
Nashville, TN
37210
Attn. RA# _____

Canada

Northern Telecom Canada Ltd.
Customer Service Dept. 914
12345 Boul Albert Hudon
Montréal-Nord, Québec
H1G 3L1

Specifications and wiring charts

Service tone cadences

Tone	Cadence (seconds)
Busy	0.5 ON / 0.5 OFF
Overflow	0.25 ON / 0.25 OFF
Ringback	2.0 ON / 4.0 OFF
Confirmation tone	1.0 ON / 1.0 OFF (3 bursts followed by no tone)
Recall tone	1.0 ON / 1.0 OFF (3 bursts followed by steady tone)
Ring splash	0.2 ON (1 burst)

Power specifications for the 110 V system

Characteristic	KSU	TM	SM
Voltage V ac	92-127	92-127	92-127
Current A rms (max)	1.75	1.75	1.0
Frequency Hz	47-63	47-63	47-63
Crest factor	4.0	4.0	4.0

Power specifications for the 220 V system

Characteristic	KSU	TM	SM
Voltage V ac	170-264	170-264	170-264
Current A rms (max)	1.0	1.0	0.5
Frequency Hz	45-63	45-63	45-63
Crest factor	4.0	4.0	4.0

Telephone loop specifications

Characteristic	Value
Loop resistance	50 Ω (295 m of 0.5 mm wire or 1000 ft of 24 AWG wire)
Loop length	150 Ω per conductor between TC and network interface for E, SG, M, and SB leads on an E&M/DISA TC
Terminating impedance	600 Ω
Flash rate (incoming alerting call)	1 Hz (50% duty cycle)
Minimum voltage at telephone	10 V dc
Current at telephone (idle)	45 mA nominal
Current at telephone (active)	80 mA maximum

Electrical requirements

Characteristic	Spec/Value
Electrostatic discharge KSU and telephones	IEC 801-2 severity level 4 maximum of 12 kV with a 150 Ω /150 pF probe
Connectors	IEC 801-2 severity level 2
Radiated immunity	maximum of 5 V/m from 10 kHz to 1 GHz
Conducted immunity	maximum of 2 V rms or 86 dB μ A from 0.06 to 0.1 MHz maximum of 92 dB μ A from 0.011 to 30 MHz

Mechanical requirements

Vibration operational	IEC 68-2-6-Fc
Resonance search	IEC 68-2-6-Fc
Vibration endurance transportation	IEC 68-2-6-Fc
Bounce	IEC 68-2-55 A
Shock fragility	IEC 68-2-27-Ea
Unpacked drop	IEC 68-2-31-Ec
Packaged drop	NSTA Proj. 1A

Environmental requirements

Characteristic	Spec/Value
Operating temperature range	I.E.C. 68-2-1 Tests Ad and Ab 0°C to 50°C (32°F to 122°F)
Storage temperature range	I.E.C. 68-2-2 Test Bd -55°C to 70°C (-67°F to 158°F)
Thermal shock	I.E.C. 68-2-14 Test Na
Humidity above 34°C (93°F)	5% to 95% (non-condensing) 52 mbar of water vapor pressure

Humidity

Norstar Modular equipment can operate from 0°C to 50°C (32°F to 122°F) with relative humidities between 5% and 95% RH except that at temperatures above 34°C (93°F) the relative humidity may be limited to 52 mbar of water vapor pressure.

For the purpose of demonstration of compliance, the product shall be exposed to 40°C (104°F) at 90% to 95% RH for 3 days followed by operational tests.

In addition, the product (without its transportation package) shall be able to withstand 10 days storage at 40°C (104°F) at 90% to 95% RH as per I.E.C. 68-2-3, Test Ca, Severity A, without evidence of corrosion, physical damage or degradation in electrical performance.

Transportation methods

No special constraints need be applied to standard methods of shipment (such as air freight, truck, and rail) except for the -55°C (-67°F) storage limit.

Port numbering

Port number coding on the wiring charts

The code shown for "Ports" (as on the wiring charts for Trunk Module external line wiring and Station Module internal wiring) shows the link between particular port numbers and the wiring on the distribution block. This is useful for example, in tracking down faults during a Maintenance session where codes appear on a Norstar telephone display indicating error messages (see the Maintenance chapter).

The code shown on the charts (for example: "X12") has two components:

- "X" corresponds to the number which appears on the face of the Expansion Cartridge port to which the Trunk Module or Station Module is connected.
- Numerical digits (for example "01" or "12") identify an individual port number associated with that Expansion Cartridge.

For example:

The code "812" appearing as part of an error message for a Trunk Module indicates Expansion Cartridge port #8 and internal port "12". The corresponding Trunk Module pins on the distribution block are Pin 47 (Violet-Orange) and Pin 22 (Orange-Violet). These codes apply to both Trunk Modules and Station Modules (up to "X16" for Station Modules for up to 16 telephones; up to "X12" for Trunk Modules for up to 12 external lines).

Norstar system numbering plan

The Norstar system provides flexibility in the assignment of line pool access codes and internal numbers (also called Directory Numbers or DNs).

The Numbering Plan follows specific rules such as:

- Internal numbers can have up to seven digits.
- All internal numbers must have the same number of digits.
- Line pool access codes are one to four digits, and cannot start with the same number as:
 - the first digit of any internal number
 - the first digit of any Received number
 - the Park prefix
 - the Direct-dial digit
- The digit "0" may be assigned to a telephone. If this is the case, no internal number or Call Park Retrieval code can begin with "0".
- The same sequence of digits cannot be used for two internal numbers, for two line pool access codes, or for both an internal number and a line pool access code. All codes and numbers must be unique.
- Symbols such as an asterisk (*) or a pound sign (#) cannot be used in internal numbers or line pool access codes.

Key Service Unit (KSU)

The Key Service Unit (KSU) has 8 lines and 24 telephones.

In the charts on the following page, notice that the KSU has two internal ports, KSU #1 and KSU #2. KSU #1 handles telephones. KSU #2 handles lines.

Two-port Expansion Cartridge

One or two DS-30 cables for Trunk Modules and/or Station Modules can be plugged into a Two-port Expansion Cartridge.

Six-port Expansion Cartridge

A combination of up to six Trunk Modules and/or Station Modules can be plugged into a Six-port Expansion Cartridge.

B1 and B2 Directory Numbers (DN)

The terms B1 and B2 correspond to channels on Norstar for transmitting voice and data. Each DN port number has a B1 DN and a B2 DN. Devices such as the Norstar M7100, M7208, M7310, and M7324 Telephones use only the B1 DN. Other devices may need both B1 and B2 channels, therefore requiring B1 and B2 DNs.

Non-expanded system (KSU alone) numbering

Port #	External lines	External line ports	B1 DN	B2 DN	DN ports
KSU (#2)	1 - 8	201-208	— —	— —	— —
KSU (#1)	— —	— —	21-44	45-68	101-124

Two-port Expansion Cartridge and KSU numbering

Expansion port #	External lines	External line ports	B1 DN	B2 DN	DN ports
#4	9-20	401-412	261-276	317-332	401-416
#3	21-32	301-312	245-260	301-316	301-316
KSU (#2)	1 - 8	201-208	— —	— —	— —
KSU (#1)	— —	— —	221-244	277-300	101-124

Six-port Expansion Cartridge and KSU numbering

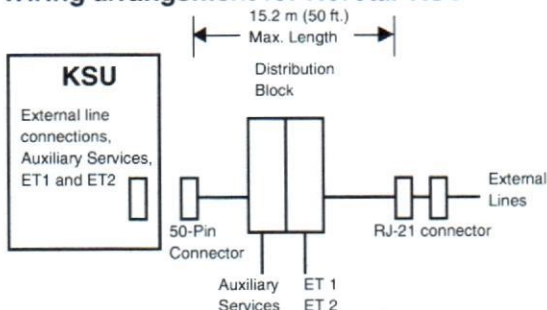
Expansion port #	External lines	External line ports	B1 DN	B2 DN	DN ports
#8	9-20	801-812	325-340	445-460	801-816
#7	21-32	701-712	309-324	429-444	701-716
#6	33-44	601-612	293-308	413-428	601-616
#5	45-56	501-512	277-292	397-412	501-516
#4	57-68	401-412	261-276	381-396	401-416
#3	69-80	301-312	245-260	365-380	301-316
KSU (#2)	1 - 8	201-208	— —	— —	— —
KSU (#1)	— —	— —	221-244	341-364	101-124

Note: B1 and B2 telephone numbers reflect the default numbering scheme.

Note: Port #3 is the bottom DS-30 cable port on both the Two-port and the Six-port Expansion Cartridge.

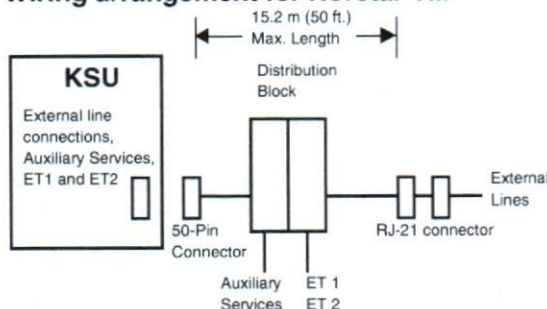
KSU wiring charts

Wiring arrangement for Norstar KSU



See the wiring chart for the Key Service Unit (KSU) to external lines and auxiliary equipment connecting arrangement.

Wiring arrangement for Norstar TM



See the wiring chart for the Trunk Module (TM) to external lines connecting arrangement.

KSU external lines and auxiliary equipment wiring

KSU external lines connector					RJ-21 external line connector	
Pin	Wire color	Port	Service	Line	Pin	Wire color
26	White-Blue	201	T	1	26	White-Blue
1	Blue-White	201	R	1	1	Blue-White
27	White-Orange	202	T	2	27	White-Orange
2	Orange-White	202	R	2	2	Orange-White
28	White-Green	203	T	3	28	White-Green
3	Green-White	203	R	3	3	Green-White
29	White-Brown	204	T	4	29	White-Brown
4	Brown-White	204	R	4	4	Brown-White
30	White-Slate	205	T	5	30	White-Slate
5	Slate-White	205	R	5	5	Slate-White
31	Red-Blue	206	T	6	31	Red-Blue
6	Blue-Red	206	R	6	6	Blue-Red
32	Red-Orange	207	T	7	32	Red-Orange
7	Orange-Red	207	R	7	7	Orange-Red
33	Red-Green	208	T	8	33	Red-Green
8	Green-Red	208	R	8	8	Green-Red

Port number code: see the explanation page preceding the charts.

KSU external lines connector				Aux equipment connections	
Pin	Wire color	Service	Line	Pin	Wire color
34	Red-Brown		No connection		
9	Brown-Red		No connection		
35	Red-Slate	T	ET 1	35	Red-Slate
10	Slate-Red	R	ET 1	10	Slate-Red
36	Black-Blue	T	ET 2	36	Black-Blue
11	Blue-Black	R	ET 2	11	Blue-Black
37	Black-Orange	----	No connection	----	----
12	Orange-Black	----	No connection	----	----
38	Black-Green	----	No connection	----	----
13	Green-Black	----	No connection	----	----
39	Black-Brown	----	No connection	----	----
14	Brown-Black	----	No connection	----	----
40	Black-Slate	----	No connection	----	----
15	Slate-Black	----	No connection	----	----
41	Yellow-Blue	----	No connection	----	----
16	Blue-Yellow	----	No connection	----	----
42	Yellow-Orange	----	No connection	----	----
17	Orange-Yellow	----	No connection	----	----
43	Yellow-Green	T	Auxiliary Ring Make	43	Yellow-Green
18	Green-Yellow	R	Auxiliary Ring Common	18	Green-Yellow
44	Yellow-Brown	T	Auxiliary Ring Break	44	Yellow-Brown
19	Brown-Yellow		No connection	19	Brown-Yellow
45	Yellow-Slate	T	Page Relay Make	45	Yellow-Slate
20	Slate-Yellow	R	Page Relay Common	20	Slate-Yellow
46	Violet-Blue	T	Page Relay Break	46	Violet-Blue
21	Blue-Violet		No connection	21	Blue-Violet
47	Violet-Orange	T	Page Out Tip	47	Violet-Orange
22	Orange-Violet	R	Page Out Ring	22	Orange-Violet
48	Violet-Green	----	No connection	----	----
23	Green-Violet	----	No connection	----	----
49	Violet-Brown	----	No connection	----	----
24	Brown-Violet	----	No connection	----	----
50	Violet-Slate	----	No connection	----	----
25	Slate-Violet	----	No connection	----	----

Note: Auxiliary equipment can not be connected to the RJ-21 connector.

KSU internal wiring

Pin	Wire color	Port	Service	Telephones (KSU)	Default DN
26	White-Blue	101	T	1	
1	Blue-White	101	R	1	21/221/2221
27	White-Orange	102	T	2	
2	Orange-White	102	R	2	22/222/2222
28	White-Green	103	T	3	
3	Green-White	103	R	3	23/223/2223
29	White-Brown	104	T	4	
4	Brown-White	104	R	4	24/224/2224
30	White-Slate	105	T	5	
5	Slate-White	105	R	5	25/225/2225
31	Red-Blue	106	T	6	
6	Blue-Red	106	R	6	26/226/2226
32	Red-Orange	107	T	7	
7	Orange-Red	107	R	7	27/227/2227
33	Red-Green	108	T	8	
8	Green-Red	108	R	8	28/228/2228
34	Red-Brown	109	T	9	
9	Brown-Red	109	R	9	29/229/2229
35	Red-Slate	110	T	10	
10	Slate-Red	110	R	10	30/230/2230
36	Black-Blue	111	T	11	
11	Blue-Black	111	R	11	31/231/2231
37	Black-Orange	112	T	12	
12	Orange-Black	112	R	12	32/232/2232
38	Black-Green	113	T	13	
13	Green-Black	113	R	13	33/233/2233
39	Black-Brown	114	T	14	
14	Brown-Black	114	R	14	34/234/2234
40	Black-Slate	115	T	15	
15	Slate-Black	115	R	15	35/235/2235
41	Yellow-Blue	116	T	16	
16	Blue-Yellow	116	R	16	36/236/2236
42	Yellow-Orange	117	T	17	
17	Orange-Yellow	117	R	17	37/237/2237
43	Yellow-Green	118	T	18	
18	Green-Yellow	118	R	18	38/238/2238
44	Yellow-Brown	119	T	19	
19	Brown-Yellow	119	R	19	39/239/2239
45	Yellow-Slate	120	T	20	
20	Slate-Yellow	120	R	20	40/240/2240
46	Violet-Blue	121	T	21	
21	Blue-Violet	121	R	21	41/241/2241
47	Violet-Orange	122	T	22	
22	Orange-Violet	122	R	22	42/242/2242
48	Violet-Green	123	T	23	
23	Green-Violet	123	R	23	43/243/2243
49	Violet-Brown	124	T	24	
24	Brown-Violet	124	R	24	44/244/2244
50	Violet-Slate	----	----	Music-on-hold ground	----
25	Slate-Violet	----	----	Music-on-hold input	----

Note: T and R represent station connections and should not be confused with Tip and Ring on external lines. Station connections are non-polarized.

CAUTION: For "Music -on-hold", ensure that the polarity of the audio input is the same as identified above for pins 50(Violet-Slate) and 25(Slate-Violet) to avoid damage to audio equipment

Station Module wiring chart

Pin	Wire color	Port	Service	Telephones (SM)
26	White-Blue	X01	T	1
1	Blue-White	X01	R	1
27	White-Orange	X02	T	2
2	Orange-White	X02	R	2
28	White-Green	X03	T	3
3	Green-White	X03	R	3
29	White-Brown	X04	T	4
4	Brown-White	X04	R	4
30	White-Slate	X05	T	5
5	Slate-White	X05	R	5
31	Red-Blue	X06	T	6
6	Blue-Red	X06	R	6
32	Red-Orange	X07	T	7
7	Orange-Red	X07	R	7
33	Red-Green	X08	T	8
8	Green-Red	X08	R	8
34	Red-Brown	X09	T	9
9	Brown-Red	X09	R	9
35	Red-Slate	X10	T	10
10	Slate-Red	X10	R	10
36	Black-Blue	X11	T	11
11	Blue-Black	X11	R	11
37	Black-Orange	X12	T	12
12	Orange-Black	X12	R	12
38	Black-Green	X13	T	13
13	Green-Black	X13	R	13
39	Black-Brown	X14	T	14
14	Brown-Black	X14	R	14
40	Black-Slate	X15	T	15
15	Slate-Black	X15	R	15
41	Yellow-Blue	X16	T	16
16	Blue-Yellow	X16	R	16
42	Yellow-Orange	----	----	no connection
17	Orange-Yellow	----	----	no connection
43	Yellow-Green	----	----	no connection
18	Green-Yellow	----	----	no connection
44	Yellow-Brown	----	----	no connection
19	Brown-Yellow	----	----	no connection
45	Yellow-Slate	----	----	no connection
20	Slate-Yellow	----	----	no connection
46	Violet-Blue	----	----	no connection
21	Blue-Violet	----	----	no connection
47	Violet-Orange	----	----	no connection
22	Orange-Violet	----	----	no connection
48	Violet-Green	----	----	no connection
23	Green-Violet	----	----	no connection
49	Violet-Brown	----	----	no connection
24	Brown-Violet	----	----	no connection
50	Violet-Slate	----	----	no connection
25	Slate-Violet	----	----	no connection

Note: T and R represent station connections and should not be confused with Tip and Ring on external lines. Station connections are non-polarized.

Note: Port number code: see the explanation page preceding the charts.

Loop Start or CI Trunk Cartridge wiring chart

TM 50-pin connector arrangement						RJ-21 connector	
TC Slot	Pin	Wire color	Port	Service	Line	Pin	Wire color
Slot 1	26	White-Blue	X01	T	1	26	White-Blue
	1	Blue-White	X01	R	1	1	Blue-White
	27	White-Orange	X02	T	2	27	White-Orange
	2	Orange-White	X02	R	2	2	Orange-White
	28	White-Green	----	No connection	----	----	----
	3	Green-White	----	No connection	----	----	----
	29	White-Brown	----	No connection	----	----	----
	4	Brown-White	----	No connection	----	----	----
	30	White-Slate	X03	T	3	28	White-Green
	5	Slate-White	X03	R	3	3	Green-White
	31	Red-Blue	X04	T	4	29	White-Brown
	6	Blue-Red	X04	R	4	4	Brown-White
	32	Red-Orange	----	No connection	----	----	----
	7	Orange-Red	----	No connection	----	----	----
	33	Red-Green	----	No connection	----	----	----
	8	Green-Red	----	No connection	----	----	----
Slot 2	34	Red-Brown	X05	T	5	30	White-Slate
	9	Brown-Red	X05	R	5	5	Slate-White
	35	Red-Slate	X06	T	6	31	Red-Blue
	10	Slate-Red	X06	R	6	6	Blue-Red
	36	Black-Blue	----	No connection	----	----	----
	11	Blue-Black	----	No connection	----	----	----
	37	Black-Orange	----	No connection	----	----	----
	12	Orange-Black	----	No connection	----	----	----
	38	Black-Green	X07	T	7	32	Red-Orange
	13	Green-Black	X07	R	7	7	Orange-Red
	39	Black-Brown	X08	T	8	33	Red-Green
	14	Brown-Black	X08	R	8	8	Green-Red
	40	Black-Slate	----	No connection	----	----	----
	15	Slate-Black	----	No connection	----	----	----
	41	Yellow-Blue	----	No connection	----	----	----
	16	Blue-Yellow	----	No connection	----	----	----
Slot 3	42	Yellow-Orange	X09	T	9	34	Red-Brown
	17	Orange-Yellow	X09	R	9	9	Brown-Red
	43	Yellow-Green	X10	T	10	35	Red-Slate
	18	Green-Yellow	X10	R	10	10	Slate-Red
	44	Yellow-Brown	----	No connection	----	----	----
	19	Brown-Yellow	----	No connection	----	----	----
	45	Yellow-Slate	----	No connection	----	----	----
	20	Slate-Yellow	----	No connection	----	----	----
	46	Violet-Blue	X11	T	11	36	Black-Blue
	21	Blue-Violet	X11	R	11	11	Blue-Black
	47	Violet-Orange	X12	T	12	37	Black-Orange
	22	Orange-Violet	X12	R	12	12	Orange-Black
	48	Violet-Green	----	No connection	----	----	----
	23	Green-Violet	----	No connection	----	----	----
	49	Violet-Brown	----	No connection	----	----	----
	24	Brown-Violet	----	No connection	----	----	----
	50	Violet-Slate	----	ET	----	----	No connection
	25	Slate-Violet	----	ET	----	----	No connection

Note: Auxiliary equipment can not be connected to the RJ-21 connector.

For an explanation of Port codes, see the section called Port number coding on the wiring charts.

E&M or DISA Trunk Cartridge wiring chart

Using the E&M/DISA wiring chart

Use the diagrams in this section when a Norstar Trunk Module (TM) contains E&M/DISA Trunk Cartridges (TC) or a mixture of E&M/DISA and DID or loop start TCs.

Chart: Trunk Module with E&M/DISA cartridges

- shows the 50-pin connections on the TM.
- shows the RJ2HX/CA2HA cross-connections;
- to be used where E&M/DISA TCs alone are installed.

To obtain the cross-connections for E&M/DISA service, read across the column headings.

Example of how to read wiring charts for mixed service

- to be used where there is a mixture of E&M/DISA, DID, and loop start TCs.

To obtain the cross-connections for mixed service, match Service columns on the appropriate charts in the example.

Note: When installing a mixture of E&M/DISA and DID or loop start TCs, it is important to cross-connect the wiring for each type of TC to a separate distribution block.

In addition, the cross-connections to each distribution block must always begin at pins 26 and 1. This allows you to wire to the correct pins for an RJ-21 connection and for an RJ2HX/CA2HA connection.

Note: To retain emergency telephone function, a loop start TC should go in the first slot of the TM.

E&M/DISA cross connections

When you are required to connect two RJ2HX/CA2HA distribution blocks together (connecting to another Norstar or Private Branch Exchange), you will need to make these cross connections:

Back-to-back cross connections

1st distribution block	T	R	T1	R1	E	SG	M	SB
Next distribution block	T1	R1	T	R	SB	M	SG	E

- 1 T TIP
- 2 R TIP
- 3 T1 RING
- 4 R1 RING
- 5 E
- 6 SG
- 7 M
- 8 SB

Trunk Module with E&M/DISA Trunk Cartridges and RJ2HX/CA2HA wiring connections

TM 50-pin connector arrangement						RJ2HX/CA2HA connector	
TC Slot	Pin	Wire color	Port	Service	Line	Pin	Wire color
Slot 1	26	White-Blue	X01	T	1	26	White-Blue
	1	Blue-White	X01	R	1	1	Blue-White
	27	White-Orange	X01	T1	1	27	White-Orange
	2	Orange-White	X01	R1	1	2	Orange-White
	28	White-Green	X01	E	1	28	White-Green
	3	Green-White	X01	SG	1	3	Green-White
	29	White-Brown	X01	M	1	29	White-Brown
	4	Brown-White	X01	SB	1	4	Brown-White
	30	White-Slate	X02	T	2	30	White-Slate
	5	Slate-White	X02	R	2	5	Slate-White
	31	Red-Blue	X02	T1	2	31	Red-Blue
	6	Blue-Red	X02	R1	2	6	Blue-Red
	32	Red-Orange	X02	E	2	32	Red-Orange
	7	Orange-Red	X02	SG	2	7	Orange-Red
	33	Red-Green	X02	M	2	33	Red-Green
	8	Green-Red	X02	SB	2	8	Green-Red
Slot 2	34	Red-Brown	X03	T	3	34	Red-Brown
	9	Brown-Red	X03	R	3	9	Brown-Red
	35	Red-Slate	X03	T1	3	35	Red-Slate
	10	Slate-Red	X03	R1	3	10	Slate-Red
	36	Black-Blue	X03	E	3	36	Black-Blue
	11	Blue-Black	X03	SG	3	11	Blue-Black
	37	Black-Orange	X03	M	3	37	Black-Orange
	12	Orange-Black	X03	SB	3	12	Orange-Black
	38	Black-Green	X04	T	4	38	Black-Green
	13	Green-Black	X04	R	4	13	Green-Black
	39	Black-Brown	X04	T1	4	39	Black-Brown
	14	Brown-Black	X04	R1	4	14	Brown-Black
	40	Black-Slate	X04	E	4	40	Black-Slate
	15	Slate-Black	X04	SG	4	15	Slate-Black
	41	Yellow-Blue	X04	M	4	41	Yellow-Blue
	16	Blue-Yellow	X04	SB	4	16	Blue-Yellow
Slot 3	42	Yellow-Orange	X05	T	5	42	Yellow-Orange
	17	Orange-Yellow	X05	R	5	17	Orange-Yellow
	43	Yellow-Green	X05	T1	5	43	Yellow-Green
	18	Green-Yellow	X05	R1	5	18	Green-Yellow
	44	Yellow-Brown	X05	E	5	44	Yellow-Brown
	19	Brown-Yellow	X05	SG	5	19	Brown-Yellow
	45	Yellow-Slate	X05	M	5	45	Yellow-Slate
	20	Slate-Yellow	X05	SB	5	20	Slate-Yellow
	46	Violet-Blue	X06	T	6	46	Violet-Blue
	21	Blue-Violet	X06	R	6	21	Blue-Violet
	47	Violet-Orange	X06	T1	6	47	Violet-Orange
	22	Orange-Violet	X06	R1	6	22	Orange-Violet
	48	Violet-Green	X06	E	6	48	Violet-Green
	23	Green-Violet	X06	SG	6	23	Green-Violet
	49	Violet-Brown	X06	M	6	49	Violet-Brown
	24	Brown-Violet	X06	SB	6	24	Brown-Violet
	50	Violet-Slate	----	ET	----	----	No connection
	25	Slate-Violet	----	ET	----	----	No connection

Note: Auxiliary equipment can not be connected to the RJ2HX/CA2HA connector.
For an explanation of Port codes, see the section called Port number coding on the charts.

Example of how to read the E&M/DISA wiring chart

M12x0 Trunk module with Loop Start and E&M/DISA cartridges

Trunk module (TM) 56-pin connector arrangement

TC Slot	Pin	Wire Color	Part	Service
Slot 1	26	White-Blue	X01	T
	1	Blue-White	X01	R
	27	White-Orange	X02	T
	2	Orange-White	X02	R
	28	White-Green	--	no connection
	3	Green-White	--	no connection
	29	White-Brown	--	no connection
	4	Brown-White	--	no connection
	30	White-Slate	X03	T
	5	Slate-White	X03	R
	31	Red-Blue	X04	T
	6	Blue-Red	X04	R
	32	Red-Orange	--	no connection
	7	Orange-Red	--	no connection
	33	Red-Green	--	no connection
	8	Green-Red	--	no connection
Slot 2	34	Red-Brown	X05	T
	9	Brown-Red	X05	R
	35	Red-Slate	X06	T
	10	Slate-Red	X06	R
	36	Black-Blue	--	no connection
	11	Blue-Black	--	no connection
	37	Black-Orange	--	no connection
	12	Orange-Black	--	no connection
	38	Black-Green	X07	T
	13	Green-Black	X07	R
	39	Black-Brown	X08	T
	14	Brown-Black	X08	R
	40	Black-Slate	--	no connection
	15	Slate-Black	--	no connection
	41	Yellow-Blue	--	no connection
	16	Blue-Yellow	--	no connection
Slot 3	42	Yellow-Orange	X09	T
	17	Orange-Yellow	X09	R
	43	Yellow-Green	X09	T1
	18	Green-Yellow	X09	R1
	44	Yellow-Brown	X09	E
	19	Brown-Yellow	X09	SG
	45	Yellow-Slate	X09	M
	20	Slate-Yellow	X09	SB
	46	Violet-Blue	X10	T
	21	Blue-Violet	X10	R
	47	Violet-Orange	X10	T1
	22	Orange-Violet	X10	R1
	48	Violet-Green	X10	E
	23	Green-Violet	X10	SG
	49	Violet-Brown	X10	M
	24	Brown-Violet	X10	SB
	50	Violet-Slate	--	ET
	25	Slate-Violet	--	ET

RJ-21/CA-21 wiring connections (Loop Start)

Service	Line	Pin	Wire Color
T	1	26	White-Blue
R	2	1	Blue-White
T	2	27	White-Orange
R	2	2	Orange-White
T	3	28	White-Green
R	3	3	Green-White
T	4	29	White-Brown
R	4	4	Brown-White
T	5	30	White-Slate
R	5	5	Slate-White
T	6	31	Red-Blue
R	6	6	Blue-Red
T	7	32	Red-Orange
R	7	7	Orange-Red
T	8	33	Red-Green
R	8	8	Green-Red
T	9	34	Red-Brown
R	9	9	Brown-Red
T	10	35	Red-Slate
R	10	10	Slate-Red
T	11	36	Black-Blue
R	11	11	Blue-Black
T	12	37	Black-Orange
R	12	12	Orange-Black

RJ2HX/CA2HA wiring connections (E&M/DISA)

Service	Line	Pin	Wire Color
T	1	26	White-Blue
R	1	1	Blue-White
T1	1	27	White-Orange
R1	1	2	Orange-White
E	1	28	White-Green
SG	2	3	Green-White
M	1	29	White-Brown
SB	1	4	Brown-White
T	2	30	White-Slate
R	2	5	Slate-White
T1	2	31	Red-Blue
R1	2	6	Blue-Red
E	2	32	Red-Orange
SG	2	7	Orange-Red
M	2	33	Red-Green
SB	2	8	Green-Red
T	3	34	Red-Brown
R	3	9	Brown-Red
T1	3	35	Red-Slate
R1	3	10	Slate-Red
E	3	36	Black-Blue
SG	3	11	Blue-Black
M	3	37	Black-Orange
SB	3	12	Orange-Black
T	4	38	Black-Green
R	4	13	Green-Black
T1	4	39	Black-Brown
R1	4	14	Brown-Black
E	4	40	Black-Slate
SG	4	15	Slate-Black
M	4	41	Yellow-Blue
SB	4	16	Blue-Yellow
T	5	42	Yellow-Orange
R	5	17	Orange-Yellow
T1	5	43	Yellow-Green
R1	5	18	Green-Yellow
E	5	44	Yellow-Brown
SG	5	19	Brown-Yellow
M	5	45	Yellow-Slate
SB	5	20	Slate-Yellow
T	6	46	Violet-Blue
R	6	21	Blue-Violet
T1	6	47	Violet-Orange
R1	6	22	Orange-Violet
E	6	48	Violet-Green
SG	6	23	Green-Violet
M	6	49	Violet-Brown
SB	6	24	Brown-Violet
--	no connection	50	--
--	no connection	25	--

Wiring charts for mixed service

Shown here is an installation with two Loop Start TCs in Slots 1 and 2 and one E&M/DISA TC in Slot 3.

Slots 1 and 2: Only the T and R leads are connected.

Slot 3: All leads are connected.

Note that the E&M/DISA connections (on the RJ2HX/CA2HA chart) begin on a new distribution block. Line numbers begin at pins 26 and 1 to indicate the first E&M/DISA (RJ2HX/CA2HA) line.

DID Trunk Cartridge wiring chart

Using the DID wiring chart

Use the diagrams in this section when a Norstar Trunk Module (TM) contains DID Trunk Cartridges (TC) or a mixture of DID and E&M/DISA or loop start TCs.

Chart: Trunk Module with DID cartridges

- shows the 50-pin connections on the TM.
- shows the RJ-21 cross-connections;
- to be used where DID TCs alone are installed.

To obtain the cross-connections for DID service, read across the column headings.

Example of how to read wiring charts for mixed service

- to be used where there is a mixture of DID and E&M/DISA or loop start TCs.

To obtain the cross-connections for mixed service, match Service columns on the appropriate charts in the example.

Note: When installing a mixture of DID and E&M/DISA or loop start TCs, it is important to cross-connect the wiring for each type of TC to a separate distribution block.

In addition, the cross-connections to each distribution block must always begin at pins 26 and 1. This allows you to wire to the correct pins for an RJ-21 connection and for an RJ2HX/CA2HA connection.

Note: To retain Emergency Telephone function with mixed service, a loop start TC should go in the first slot of the TM.

DID supervisory signaling

Allowing this equipment to be operated in a manner that does not provide for proper answer supervision signaling, as outlined below, is in violation of FCC Part 68 Rules, and may be in violation of local tariffs.

This equipment is designed to return supervisory signals to the Public Switched Telephone Network (PSTN) when the DID calls are:

- answered by the called station
- answered by the attendant
- routed to a customer controlled recorded announcement
- routed to a dial prompt

This equipment is designed to return supervisory signals on all DID calls forwarded through the system back to the PSTN within 20 s of the call forwarding sequence being initiated.

Emergency transfer conditions

Every DID Trunk Cartridge has a Control Circuit Interface (CCI) which should be connected directly to the Central Office for monitoring purposes.

If the Norstar system loses power or the microcontroller on the DID Trunk Cartridge malfunctions, the CCI signals the Central Office that it can no longer handle DID calls. The Central Office, by pre-arrangement, can then forward the DID lines to other numbers.

Note: The CCI signaling to report power loss or malfunction of the DID Trunk Cartridge is not supported by all carriers. For carriers or installations which do not use CCI signaling, the CCI and ET connections should be treated as "No connection".

Trunk Module with DID Trunk Cartridges and RJ-21 wiring connections

TM 50-pin connector arrangement						RJ-21 connector	
TC Slot	Pin	Wire color	Port	Service	Line	Pin	Wire color
Slot 1	26	White-Blue	X01	T	1	26	White-Blue
	1	Blue-White	X01	R	1	1	Blue-White
	27	White-Orange	X02	T	2	27	White-Orange
	2	Orange-White	X02	R	2	2	Orange-White
	28	White-Green	----	No connection	----	----	---
	3	Green-White	----	No connection	----	----	---
	29	White-Brown	----	CCI NC1	----	28	White-Green
	4	Brown-White	----	CCI Com1	----	3	Green-White
	30	White-Slate	X03	T	3	29	White-Brown
	5	Slate-White	X03	R	3	4	Brown-White
	31	Red-Blue	X04	T	4	30	White-Slate
	6	Blue-Red	X04	R	4	5	Slate-White
	32	Red-Orange	----	No connection	----	----	---
	7	Orange-Red	----	No connection	----	----	---
	33	Red-Green	----	No connection	----	----	---
	8	Green-Red	----	No connection	----	----	---
Slot 2	34	Red-Brown	X05	T	5	31	Red-Blue
	9	Brown-Red	X05	R	5	6	Blue-Red
	35	Red-Slate	X06	T	6	32	Red-Orange
	10	Slate-Red	X06	R	6	7	Orange-Red
	36	Black-Blue	----	No connection	----	----	---
	11	Blue-Black	----	No connection	----	----	---
	37	Black-Orange	----	CCI NC1	----	33	Red-Green
	12	Orange-Black	----	CCI Com1	----	8	Green-Red
	38	Black-Green	X07	T	7	34	Red-Brown
	13	Green-Black	X07	R	7	9	Brown-Red
	39	Black-Brown	X08	T	8	35	Red-Slate
	14	Brown-Black	X08	R	8	10	Slate-Red
	40	Black-Slate	----	No connection	----	----	---
	15	Slate-Black	----	No connection	----	----	---
	41	Yellow-Blue	----	No connection	----	----	---
	16	Blue-Yellow	----	No connection	----	----	---
Slot 3	42	Yellow-Orange	X09	T	9	36	Black-Blue
	17	Orange-Yellow	X09	R	9	11	Blue-Black
	43	Yellow-Green	X10	T	10	37	Black-Orange
	18	Green-Yellow	X10	R	10	12	Orange-Black
	44	Yellow-Brown	----	No connection	----	----	---
	19	Brown-Yellow	----	No connection	----	----	---
	45	Yellow-Slate	----	CCI NC1	----	38	Black-Green
	20	Slate-Yellow	----	CCI Com1	----	13	Green-Black
	46	Violet-Blue	X11	T	11	39	Black-Brown
	21	Blue-Violet	X11	R	11	14	Brown-Black
	47	Violet-Orange	X12	T	12	40	Black-Slate
	22	Orange-Violet	X12	R	12	15	Slate-Black
	48	Violet-Green	----	No connection	----	----	---
	23	Green-Violet	----	No connection	----	----	---
	49	Violet-Brown	----	No connection	----	----	---
	24	Brown-Violet	----	No connection	----	----	---
	50	Violet-Slate	----	ET	----	----	No connection
	25	Slate-Violet	----	ET	----	----	No connection

Note: Auxiliary equipment can not be connected to the RJ-21 connector.

Port codes are explained in the section Port number coding on the wiring charts.

Note: For CCI connections in Service column: NC1 stands for the normally closed relay and Com1 the common relay.

Note: CCI signaling is not supported by all carriers. For carriers or installations which do not use CCI signaling, the CCI and ET connections should be treated as "No connection".

CCI wiring is a non-standard wiring arrangement which has been submitted to the DOC.

Example of how to read the DID wiring chart

M12x0 Trunk module with DID and E&M/DISA cartridges

Trunk module (TM) 50-pin connector arrangement

TC Slot	Pin	Wire Color	Port	Service
Slot 1	26	White-Blue	X01	T
	1	Blue-White	X01	R
	27	White-Orange	X02	T
	2	Orange-White	X02	R
	28	White-Green	--	no connection
	3	Green-White	--	no connection
	29	White-Brown	--	CCI NC1
	4	Brown-White	--	CCI Com1
	30	White-Slate	X03	T
	5	Slate-White	X03	R
	31	Red-Blue	X04	T
	6	Blue-Red	X04	R
	32	Red-Orange	--	no connection
	7	Orange-Red	--	no connection
	33	Red-Green	--	no connection
	8	Green-Red	--	no connection
Slot 2	34	Red-Brown	X05	T
	9	Brown-Red	X05	R
	35	Red-Slate	X06	T
	10	Slate-Red	X06	R
	36	Black-Blue	--	no connection
	11	Blue-Black	--	no connection
	37	Black-Orange	--	CCI NC1
	12	Orange-Black	--	CCI Com1
	38	Black-Green	X07	T
	13	Green-Black	X07	R
	39	Black-Brown	X08	T
	14	Brown-Black	X08	R
	40	Black-Slate	--	no connection
	15	Slate-Black	--	no connection
	41	Yellow-Blue	--	no connection
	16	Blue-Yellow	--	no connection
Slot 3	42	Yellow-Orange	X09	T
	17	Orange-Yellow	X09	R
	43	Yellow-Green	X09	T1
	18	Green-Yellow	X09	R1
	44	Yellow-Brown	X09	E
	19	Brown-Yellow	X09	SG
	45	Yellow-Slate	X09	M
	20	Slate-Yellow	X09	SB
	46	Violet-Blue	X10	T
	21	Blue-Violet	X10	R
	47	Violet-Orange	X10	T1
	22	Orange-Violet	X10	R1
	48	Violet-Green	X10	E
	23	Green-Violet	X10	SG
	49	Violet-Brown	X10	M
	24	Brown-Violet	X10	SB
	50	Violet-Slate	--	ET
	25	Slate-Violet	--	ET

RJ-21/CA-21 wiring connections (DID)

Service	Line	Pin	Wire Color
T	1	26	White-Blue
R	1	1	Blue-White
T	2	27	White-Orange
R	2	2	Orange-White
CCI	-	28	White-Green
CCI	-	3	Green-White
T	3	29	White-Brown
R	3	4	Brown-White
T	4	30	White-Slate
R	4	5	Slate-White
T	5	31	Red-Blue
R	5	6	Blue-Red
T	6	32	Red-Orange
R	6	7	Orange-Red
CCI	-	33	Red-Green
CCI	-	8	Green-Red
T	7	34	Red-Brown
R	7	9	Brown-Red
T	8	35	Red-Slate
R	8	10	Slate-Red
T	9	36	Black-Blue
R	9	11	Blue-Black
T	10	37	Black-Orange
R	10	12	Orange-Black
CCI	-	38	Black-Green
CCI	-	13	Green-Black
T	11	39	Black-Brown
R	11	14	Brown-Black
T	12	40	Black-Slate
R	12	15	Slate-Black

RJ2HX/CA2HA wiring connections (E&M/DISA)

Service	Line	Pin	Wire Color
T	1	26	White-Blue
R	1	1	Blue-White
T1	1	27	White-Orange
R1	1	2	Orange-White
E	1	28	White-Green
SG	1	3	Green-White
M	1	29	White-Brown
SB	1	4	Brown-White
T	2	30	White-Slate
R	2	5	Slate-White
T1	2	31	Red-Blue
R1	2	6	Blue-Red
E	2	32	Red-Orange
SG	2	7	Orange-Red
M	2	33	Red-Green
SB	2	8	Green-Red
T	3	34	Red-Brown
R	3	9	Brown-Red
T1	3	35	Red-Slate
R1	3	10	Slate-Red
E	3	36	Black-Blue
SG	3	11	Blue-Black
M	3	37	Black-Orange
SB	3	12	Orange-Black
T	4	38	Black-Green
R	4	13	Green-Black
T1	4	39	Black-Brown
R1	4	14	Brown-Black
E	4	40	Black-Slate
SG	4	15	Slate-Black
M	4	41	Yellow-Blue
SB	4	16	Blue-Yellow
T	5	42	Yellow-Orange
R	5	17	Orange-Yellow
T1	5	43	Yellow-Green
R1	5	18	Green-Yellow
E	5	44	Yellow-Brown
SG	5	19	Brown-Yellow
M	5	45	Yellow-Slate
SB	5	20	Slate-Yellow
T	6	46	Violet-Blue
R	6	21	Blue-Violet
T1	6	47	Violet-Orange
R1	6	22	Orange-Violet
E	6	48	Violet-Green
SG	6	23	Green-Violet
M	6	49	Violet-Brown
SB	6	24	Brown-Violet
--	no connection	50	--
--	no connection	25	--

Wiring charts for mixed service

Shown here is an installation with two DID TCs in Slots 1 and 2 and one E&M/DISA TC in Slot 3.

Slots 1 and 2: Only the T, R, and CCI leads are connected.

Slot 3: All leads are connected.

Note that the E&M/DISA connections (on the RJ2HX/CA2HA chart) begin on a new distribution block.

Line numbers begin at pins 26 and 1 to indicate the first E&M/DISA (RJ2HX/CA2HA) line.

Programming

After the hardware has been installed and powered up, use **Startup** to initialize the system, and select one of the four system templates.

CAUTION

Startup erases any existing programmed data, and resets the system to factory defaults.

Performing Startup

1. Enter the Startup access code from a Norstar M7324 or M7310 telephone dial pad, by pressing

Feature * * 7 8 2 7 8 8 7

which is the same as

Feature * * S T A R T U P .

To be accepted, the Startup code must be entered no later than 15 minutes after the Norstar system has been powered up. (If 15 minutes have elapsed since you powered up the system, turn system power OFF and ON, to prepare for the Startup process.)

2. Enter the Installer password:

2 6 6 3 4 4

which is the same as

C O N F I G .

The Installer password is not shown on the display.

Note: The Installer password shown is the default normally used for Startup. For a system which has already been programmed, the Installer password might have been changed in Configuration and recorded below.

--	--	--	--	--	--	--

CAUTION

Wait at least two minutes after Startup before you attempt Maintenance diagnostic tests or the disabling/enabling of a module. If you do not wait two minutes, ports may be disabled.

Changing the default template

After entering the Startup access code and Installer password the display shows **Reset memory?**.

1. To select a default template, press YES.

The display shows **Template: Square**.

OR

To exit without choosing a template, press CANCEL.

2. Press CHANGE to choose one of four templates (Square, Centrex, Hybrid or PBX).

3. Press to store the programming.

The display shows **Template applied**.

The indicators begin to flash after a few moments.

The display shows **Jan 1 1:00 am**.

If power fails

All Configuration and Administration programming is retained for three days if the power fails or if the Norstar system is powered OFF. After three days without power, it may be necessary to perform Startup.

Startup defaults

The four templates available in the Norstar system are Square, Centrex, Hybrid, and PBX. The following charts show the default settings for each template.

Square defaults are listed in full. Centrex, Hybrid and PBX defaults are listed only when they differ from Square defaults.

Where a DN is specified, it is the three-digit DN that is the default on an expanded system. (Two-digit DNs are the default on non-expanded systems.)

Configuration defaults

Trk/Line Data

DATOS DE LINEAS Y CIRCUITOS.

Trunk data

DATOS DE CIRCUITO.

Parameter	Square	Centrex	Hybrid	PBX
Line <xxx> (Trunk type)	Loop			
Trunk mode	Unsupervised			
Ans mode	Manual			
Ans with DISA (presented if Ans mode is Auto)	Yes			
Signal (presented if Line is E&M)	WinkStart			
Gain (presented if Line is E&M)	Normal			
Dial mode	Pulse			
Full AutoHold on idle line (presented if Line is Loop)	No			

Received number (target lines only)

Numero interno

Parameter	Square	Centrex	Hybrid	PBX
Rec'd #	None			

Harcoelo.

Line data (physical and target lines)

Valores programados en líneas

Parameter	Square	Centrex	Hybrid	PBX
Line type	Public	Public	Lines	Pool †
			001 to 008:	Pool A
			009 to 012:	Pool B
			013 to 016:	Pool C
			017 to 020:	Pool D
			021 to 024:	Pool E
			025 to 028:	Pool F
			029 to 032:	Pool G
			033 to 036:	Pool H
			037 to 040:	Pool I
			041 to 044:	Pool J
			045 to 048:	Pool K
			049 to 052:	Pool L
			053 to 056:	Pool M
			057 to 060:	Pool N
			061 to 064:	Pool O

telf. principal.
Para cada lin.Prime Telephone
for each line

DN 221

Timbre aux.
Para cada lin.Auxiliary ringer
for each line

Yes

uso exclusivo
Automa.

Auto privacy

Yes

† Target lines cannot be placed into line pools.

Las líneas de selección directa no pueden colocarse
en grupos de líneas, comunes ext.

Line Access

ACCESO DE LINEAS.

	Parameter	Square	Centrex	Hybrid	PBX
Assign de líneas.	Line assignment	Line 001 Line 002	Line <nnn> †	Line 001	No lines assigned
# INT. detona	Answer DNs	None			
Líneas con timbre	Ringing lines	Ring for all DNs. <i>Timbre para todo el int</i>	Ring for all assigned lines.	Ring for DN 221. No ring for other DNs.	No lines assigned.
		Any lines added Ring.	Any lines added Ring.	Any lines added Ring.	Any lines added Ring.
Líneas con timbre	Ringing lines for target lines	No target lines are assigned automatically, but any lines added will be Ring			
Para líneas de Selección Directa	Line Pool access	No	No	Yes (Pool A)	
Acceso de grupo de líneas	Intercom keys	2			
Teclos de intercom	Prime line	None	Line <nnn> †	Intercom	Intercom

† <nnn> is a three digit line number. The Centrex template automatically performs a sequential assignment of lines to DN's. It assigns Line 001 to DN 221, Line 002 to DN 222, and so on, until all lines in the system have been assigned to DN's. These lines are automatically made the Prime Lines for the DN's.

Call Handling

MANEJO DE LLAMADAS

	Parameter	Square	Centrex	Hybrid	PBX
QUEO DE LINEA RETENIDA.	Held line reminder	No			
DEHORA DE Aviso (s) (se presentan si el aviso de linea ret. se cambia TTD al Telf. princ.)	Remind delay (s) (presented if Held line reminder is changed to Yes)	60			
TTD al Telf. princ.	DRT to Prime Telephone	Yes			
TTD # de Voces que suena el timbre	DRT delay (rings)	3			
	Transfer callback (rings)	3			
	Park prefix	1	Prefijo de Estacionamiento		
	Park timeout (s)	45	Estacionamiento espinal.		
	Camp timeout (s)	45	Puesta en espera espinal		
	Directed pickup	Yes	Atencion de llamada dirigida		
	On hold	Tones	Tones		

(s) is seconds. → segundos.

Miscellaneous

	Parameter	Square	Centrex	Hybrid	PBX
Musica de Fondo	Background music	No			
# de Monocelo Directo	Direct-dial #	0			
Código de ADS	DISA DN	None			
# INT AUTO	Auto DN	None			
Tel. de Alarma	Alarm Telephone	DN 221			
Asigna. a PPP	CAP assignment	None			
Duración de Señal	Link time (ms)	600			
Reconocimiento de Tel.	Telephone relocation	No			
Demora de Señal	Host Delay (ms)	1000			
Supervisión	Supervision (ms)	460			
Cod. de acceso EXT.	External code	9	9	None	None
Código de Grupos de línea	Line pool codes	None	None	9 for Pool A None for Pools B to O	9 for Pool A None for Pools B to O
	Installer password	C O N F I G O R 2 6 6 3 4 4			

(ms) is milliseconds.

System data

DATOS DEL SISTEMA

Parameter	Square	Centrex	Hybrid	PBX
Individual DNs	Individual DNs may be changed.			
DN length	2 (non-expanded system)	3 (expanded system)	2.- SIST. DE BASE 3.- SIST. CON CAPTA de Expansión	
Rec'd # length	3 (Received numbers are used only on expanded systems.)			

3. Los números internos de Selección directa solo en los sist. con cortucho de Expansión

General administration defaults

System Speed Dial

	Parameter	Square	Centrex	Hybrid	PBX
<i>Marc Rapi</i>	Speed dial #	(no defaults assigned)			
<i>Lineas o Grp.</i>	Line or Pool	Use Prime line			
<i>Mostreo Dig</i>	Display digits	Yes			
	Name (presented if Display digits is changed to No)	Sys Spd Dial <#nn> <i>MARCADO RAPIDO DEL SIST. <#mn.</i>			
	Bypass restriction	No			

<#nn> is a two-digit System Speed Dial code (#12, for example).

Names

NOmbres.

	Parameter	Square	Centrex	Hybrid	PBX
<i>Nombres de tel.</i>	Set names	DN (221, for example)			
<i>Nombres de lin.</i>	Line names	Line number (Line 001, for example)			

Time and date

Hora y Fecha

The default time and date is: 1:00 a.m., January 1st, 1992

LOS VALORES IMPLICITOS

Direct-Dial

MARCADO DIRECTO

	Parameter	Square	Centrex	Hybrid	PBX
	Set1 <i>tel 1</i>	DN 221			
	Set2, Set3, Set4, Set5	None			

Capabilities**Dialing filters***Filtros de llamada*

Parameter	Square	Centrex	Hybrid	PBX
Filter 00	No restrictions (cannot be changed) → no puede cambiarse			
Filter 01			Hybrid and PBX settings are the same as those for the Square template <i>Los valores para los modelos. Hy PBX son los mismos, al el Básico.</i>	
Restriction 01	0	90		
Restriction 02	1	91		
Exceptions	1800	91800		
	1555	91555		
	1*1*555	91*1*555		
	1*0*555	91*0*555		
Restriction 03	911	9911		
Exceptions	911	9911		
Restriction 04	411	9411		
Restriction 05	976	9976		
Filter 02 to 99	No restrictions			

Remote access packages*Paquetes de Acceso a Distancia*

Parameter	Square	Centrex	Hybrid	PBX
Package 00	Prohibits access to line pools and Remote Page. Cannot be changed.			
Package 01				
Line pool access	Y for Pool A N for Pools B to O			
Remote Page	No			
Packages 02 - 15				
Line pool access	N for Pools A to O			
Remote Page	No			

Prohíbe el acceso a grupos de líneas, coros externos y el acceso a distancia a oficinas externas

Facultades del teléfono

Set abilities (Capabilities cont'd)

	Parameter	Square	Centrex	Hybrid	PBX
- <i>Filtro telf.</i>	Set filter	02			
- <i>Filtro telf./lin.</i>	Line/set filter	None			
- <i>Bloqueo de Tlf.</i>	Telephone lock	None			
- <i>Manos Libres</i>	Full handsfree	No			
- <i>Manos Libres Automático</i>	Automatic handsfree <i>si</i> (presented if Full handsfree is Yes)	No			
- <i>Respuesta Manos Libres</i>	Handsfree Answerback	Yes			
- <i>Grupo de Atención de llamadas</i>	Pickup group	No			
- <i>Anuncios</i>	Paging	Y			
- <i>ZONA DE ANUNCIO</i>	Page zone	1			
- <i>Timbre Auxiliar</i>	Auxiliary Ringer	No			
- <i>Marcado Directo</i>	Direct-Dial	Set1 <i>→ Tlfono #1</i>			
- <i>Desvío Ocupado</i>	Forward on busy	None			
- <i>Desvío no resp.</i>	Forward no answer	None			
- <i>Demora desvío # de llamadas (si presentasi esta activado el desvío)</i>	Forward delay (# of rings - presented if Forward no answer is ON)	3			
- <i>Redestino</i>	Allow redirect	No			
- <i>Timbre de R.</i>	Redirect ring	Yes			
- <i>Línea Reserva</i>	Hotline	None			
- <i>Uso de línea Principal (representa líneas reser. externos)</i>	Use Prime line (presented for external Hotline)	Yes			
	Priority call	No			

Proximidad de llamada

*Facultades de Teléfono***Line abilities (Capabilities cont'd)**

	Parameter	Square	Centrex	Hybrid	PBX
<i>Filtro de línea</i>	Line filter lines	03			
<i>Filt. Acc Dist</i>	Remote filter	04			
<i>Pkg te dist</i>	Remote pkg	00			

*Clases de Clases de Servicio***Class of Service (COS) passwords (Capabilities cont'd)**

	Parameter	Square	Centrex	Hybrid	PBX
<i>Clases de Clases de Servicio</i>	COS passwords	None			
<i>Filtro Usuario</i>	User filter	Deflt †	<i>Valor implícito.</i>		
<i>Filtro de línea</i>	Line filter	Deflt †	<i>significa q' nose a progr.</i>		
<i>Pkg dist</i>	Remote pkg	Deflt †	<i>ninguno.</i>		

† The 'Deflt' setting means that no COS filter is programmed by default. Any filters programmed elsewhere to apply to the telephone, the line or the user's COS password are still in effect.

Service Modes

MODALIDADES DE SERVICIO

Parameter	Square	Centrex	Hybrid	PBX
-----------	--------	---------	--------	-----

Control Telephones	DN 221			
--------------------	--------	--	--	--

Name1	Night si se cambia de Manual a Auto. (if Setting is changed from Manual to Auto: Start = 23:00, Stop = 07:00)			
-------	---	--	--	--

Name2	Evening (if Setting is changed from Manual to Auto: Start = 17:00, Stop = 23:00)			
-------	--	--	--	--

Name3	Lunch (if Setting is changed from Manual to Auto: Start = 12:00, Stop = 13:00)			
-------	--	--	--	--

Setting	Manual			
---------	--------	--	--	--

Trunk answer	Yes			
--------------	-----	--	--	--

Extra-dial Telephone	221			
----------------------	-----	--	--	--

Ringing Telephone	221			
-------------------	-----	--	--	--

Auxiliary Ringer	Yes			
------------------	-----	--	--	--

Password

Parameter	Default
-----------	---------

Administration password	A D M I N OR 2 3 6 4 6
-------------------------	---

Valores implícitos de Registro:

Log Defaults

Parameter	Default
-----------	---------

Space/Log	0
-----------	---

Espacio Reg.

Call Services

	Parameter	Default
Ver datos llamada	Auto Call Info	None
Reg. Auto Mstr	Autolog/Show	
Self. reg. ver.	Vmsg	
Msj. Voz	Logging set	N
	Show Extl Vmsg	N
Expos de	Log space	
Reg. Grupo	Log	0
	Pool	600
Clave de Reg	Log password	None
1ra opción	1st display	Name
Nº Centro Msj. Voz	Vmsg center tel#	
Centro 1 a 5	Center 1 to 5	None
líneas de Centro	Vmsg center	1
Msj. Voz	lines	

Configuration overview

Configuration programming is performed by the Installer or the Customer Service representative, and lets you change settings for the entire Norstar system, as well as settings for individual telephones and external lines. Configuration programming is the first programming done after system installation.

This chapter contains information for programming Configuration settings. If you are new to programming, you may want to practice using the detailed Administration programming procedures in the System Coordinator Guide before attempting other procedures.

For information on Administration programming, and Personal programming, see the System Coordinator Guide.

How programming is done

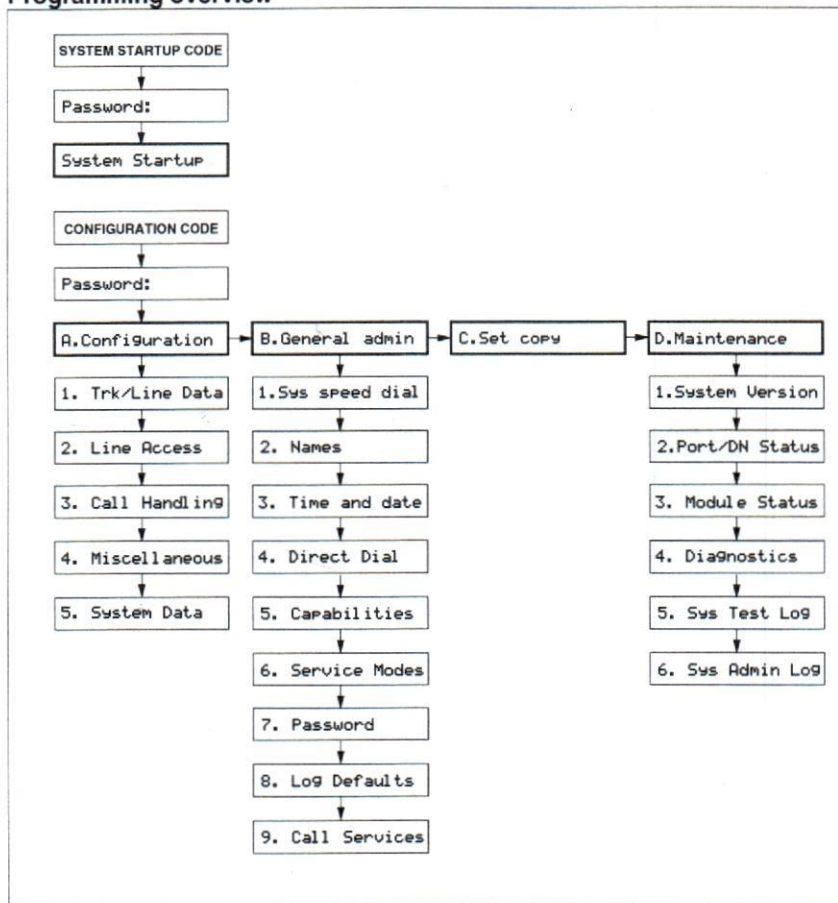
Programming is done at an M7324 or M7310 Telephone. Use the buttons on the telephone to program a setting or to request a specific programming action.

Norstar guides you step by step on the telephone display while you access programming, select and change programmable settings, and exit programming.

Reviewing programmed settings

The Set Profile and Line Profile features help you to check your programming by allowing you to review the settings. For more information, see the System Coordinator Guide.

Programming overview



Programming tools

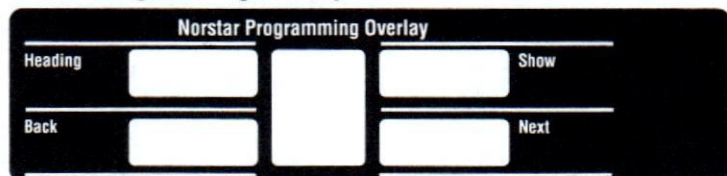
A Norstar telephone

System programming can only be performed on an M7310 or M7324 Telephone.

The Norstar Programming Overlay

The *Norstar Programming Overlay* is a paper cutout that labels four telephone buttons used during programming. This makes it easier for you to identify the button that you want. The *Norstar Programming Overlay* is provided at the end of this book.

Norstar Programming Overlay



The Norstar Modular DR5 Programming Record

The *Norstar Modular DR5 Programming Record* provides a convenient way to record what you have programmed. It also helps you to plan your programming. Settings are grouped according to their function.

Pages from the Record may be photocopied as necessary for programming many telephones or lines.

The Norstar Telephone User Cards

Each Norstar telephone has a *Norstar Telephone User Card* that lists the most commonly used features.

The Norstar Modular DR5 Telephone Feature Card

The *Norstar Modular DR5 Telephone Feature Card* lists the features that can be accessed with the button.

Entering Configuration

1. Release all calls on your telephone.
2. Enter the Configuration access code:
Feature * * C O N F I G
which is the same as
Feature * * 2 6 6 3 4 4 .
3. The display shows **Password:** .
Enter the Configuration password (the password does not appear on the display as you enter it). The default Password is **CONFIG (266344)**.

If the password is correct, the display shows
A. Configuration, and three triangular indicators ► appear on the vertical display between the rows of buttons.

If the password is incorrect, the display does not change. Check the password. Press **RETRY** and re-enter the password.
4. Place the *Norstar Programming Overlay* over the buttons pointed to by the indicators ►.

Exiting Configuration

Norstar stores your changes automatically as soon as you alter any settings; you do not need to "save" your changes.

1. Press Rls .
The display briefly shows **End of session**.

Configuration headings

Headings and subheadings in Configuration programming help you to keep track of where you are. An example of a heading is **1.Trk/Line data** for programming trunks and lines. Under that heading, one of the subheadings is **Dial mode** for programming the dial mode of a line.

Configuration programming has five headings:

CONFIGURATION CODE



Password:



A. Configuration



1. Trk/Line Data



2. Line Access



3. Call Handling



4. Miscellaneous



5. System Data

Trk/Line Data lets you assign settings to each trunk, external line and incoming target line.

Line Access lets you assign settings to each telephone.

Call Handling lets you assign system-wide settings associated with various call features.

Miscellaneous lets you assign various system-wide settings.

System Data lets you change a telephone's internal number, the length of all internal numbers, and the number of digits received by auto-answer trunks.

Moving through Configuration

To program a setting, you must first locate the correct heading. To do this, scan through the headings of Configuration using the and buttons.

To move through Configuration headings:

Begin with the display showing **A. Configuration**.

1. Press .
The display shows **1.Trk/Line Data**.
2. Press .
The display shows **2.Line Access**.
3. Press .
The display shows **3.Call Handling**.
4. Press .
The display shows **4.Miscellaneous**.
5. Press .
The display shows **5.System Data**.
6. Press .
The display shows **1.Trk/Line Data**.

Using the Overlay

The indicators show which buttons can be used at that programming step. The functions on these buttons allow you to move through the headings and subheadings of Norstar programming.

Heading

moves up in the hierarchy of headings and subheadings.

Show

moves down in the hierarchy of headings and subheadings, or to begin programming for a heading or subheading.

Next

moves to the next heading, subheading, or setting.

Back

moves to the previous heading, subheading, or setting.

The Norstar Programming Overlay is located inside the back cover of this Guide.

**M7310 Telephone with
a Norstar Programming
Overlay**

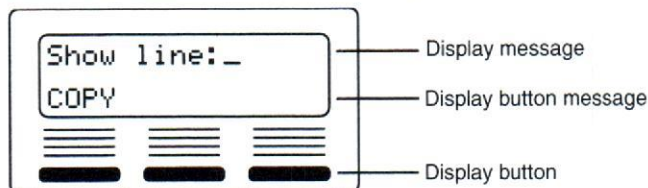


**M7324 Telephone with
a Norstar Programming
Overlay**



The Norstar display buttons

Display buttons perform many functions. Depending on where you are in programming, one, two, or three display buttons may be available at any one time. You press one of the display buttons to select the function that you want.



The most common display button labels are:

- | | |
|---------------|---|
| <u>CHANGE</u> | changes a programmable setting. |
| <u>BKSP</u> | moves the cursor one space to the left (backspace) and delete a character, allowing you to re-enter a number or letter. |
| <u>COPY</u> | copies line or telephone programming. |
| <u>VIEW→</u> | views the last part of a displayed message longer than 16 characters. |
| <u>←VIEW</u> | views the first part of a displayed message longer than 16 characters. |
| <u>--></u> | moves the cursor one position to the right when programming a name. |
| <u><--</u> | moves the cursor one position to the left when programming a name. |

Programming details

Entering numbers

Numbers are entered from the Norstar telephone dial pad. The backspace display button may be used to edit the number.

A line number must always be entered as a three-digit number. Line numbers from 10 to 99 must be entered with a leading zero (line 020, for example). Similarly, line numbers less than 10 must be entered with two leading zeros (line 002, for example).

Internal telephone numbers, also referred to as Directory Numbers (DNs), can be two- to seven-digits long on a non-expanded system, and three- to seven-digits long on an expanded system. The default DN length is two on a non-expanded system and three on an expanded system. The DN length can be changed in Configuration programming.

Viewing long telephone numbers

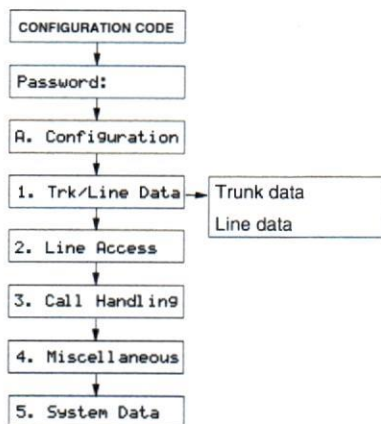
External telephone numbers can be up to 24 digits, but the telephone display is only 16 character spaces long. If you wish to see a previously programmed number that is longer than 16 digits, you must do the following:

Begin, for example, with **123456789012345**.

The display shows only the first 15 digits. The three dots (...) at the end of the display indicate that more digits remain to the external number.

1. To see the remaining digits, press **VIEW→**.
2. To see the first 15 digits again, press **←VIEW**.

Trk/Line Data



Trunk lines and Target lines

In order to configure a Norstar system, you need to distinguish between trunks and target lines.

A **trunk** is a physical line numbered from 001 to 080 (in a fully expanded system).

A **target** line is a 'virtual' communication path between an external caller and a Norstar telephone (or other Norstar device). This path is established on the basis of digits received from an incoming trunk. Target lines number from 081 to 184 (in a fully expanded Norstar system).

Having target lines, independent of the physical lines, makes it possible to have many target lines for a few physical trunks. Telephones can be configured to have an appearance of any type of line (including target lines). Calls may be placed on all lines except target lines.

Note: See the description of Line Pool programming under the **Line type** setting (in 1. Trk/Line Data, Line data) for the recommended assignments to line pools.

Line numbers for Trunks and Target lines

Type of system	KSU trunks (loop start)	Trunk Module trunks	Target lines
Non-expanded system	001 — 008	none	none
2-port Expansion Cartridge	001 — 008	009 — 032	081 — 120
6-port Expansion Cartridge	001 — 008	009 — 080	081 — 184

Trunks

A trunk provides the physical connection between a Norstar system and other systems (Norstar or otherwise) in a private or public network. Norstar uses three types of trunks:

- loop start trunks
- E&M trunks
- Direct Inward Dial (DID) trunks

Loop start and E&M trunks can be used for both incoming and outgoing calls. DID trunks, however, are used for incoming calls exclusively.

Loop start and E&M trunks operate in one of two modes for incoming calls: manual-answer or auto-answer. DID trunks operate only in auto-answer mode.

Manual-answer trunks

Incoming calls on trunks configured for manual-answer alert in the usual manner at all associated line appearances.

Auto-answer trunks

Trunks configured for auto-answer provide remote access to the system. Any line appearance of such a trunk is normally used only to monitor the incoming call status of the trunk, not to answer calls.

Incoming calls on auto-answer trunks are answered by the system. Typically, digits received from the far end are used to route the call to a specific target line.

If they are idle, auto-answer loop start and E&M trunks can be used to make outgoing calls.

Disconnect supervision

Supervision is a feature available on a CO line. You should only use the disconnect supervision setting for lines that have the Supervision feature.

Disconnect supervision is required for auto-answer trunks, but not for manual-answer trunks. Note, however, that use of unsupervised trunks (or trunks with disconnect supervision inactive) for incoming calls results in the inconsistent operation of the Line Redirection feature, the ability to tandem through the Norstar system to other systems in the network, and the ability to disconnect from a conference that involves two external callers.

Note: If a Norstar trunk without disconnect supervision is programmed for auto-answer mode, the trunk operates in manual-answer mode.

Loop start trunks

Both manual-answer and auto-answer trunks can be used for making outgoing calls or receiving incoming calls. The answer mode (manual-answer and auto-answer) determines how the system handles incoming calls.

By default, auto-answer Loop start trunks are answered by the system DISA (Direct Inward System Access) capability, and are used to provide controlled access to a Norstar system's resources from the public network.

A user makes or receives calls on a manual-answer Loop start trunk by having a line appearance of the trunk, or by selecting a line pool containing the trunk to make a call.

Note: KSU trunk lines (001 to 008) are Loop start lines.

E&M trunks

E&M trunks connect two or more systems directly in a private network.

An E&M Trunk Cartridge provides two E&M trunks and two DTMF receivers. These are given consecutive line numbers. For example, an E&M TC in slot 1 of a Trunk Module plugged into the highest numbered DS-30 port shows the E&M trunks as lines 009 and 010, and shows the DTMF receivers as line numbers 011 and 012.

E&M trunks can operate in manual-answer mode, or in auto-answer mode with disconnect supervision. Manual-answer E&M trunks alert directly at any telephone with a line appearance associated with the trunk. By default, auto-answer E&M trunks are answered by the system DISA (Direct Inward System Access) capability, and are used to provide controlled access to a Norstar system's resources from elsewhere in a private network.

Capabilities available to a remote user are determined by a Class of Service associated with the trunk or by the remote user's DISA password.

Direct Inward Dial# (DID) trunks

DID trunks handle only incoming external calls. The digits received from the Central Office are used typically to route calls to a target line. The DID call appears at every telephone configured with an appearance of that target line.

Calls can also be made to the DISA DN or the Auto DN, if the last digits of the DID number are the same as one of these DNs.

Any appearance of a DID trunk can be used only to monitor activity of the trunk, not to answer an incoming call.

Note: The digits provided by the CO need not match the Norstar numbering plan. You can use the Configuration Rec'd #: — heading to specify the digits that make a target line ring. You can use the Configuration DISA DN or Auto DN settings to specify the numbers that make the system answer a remote call automatically.

Target lines

A target line is a specific communication path reached by means of digits received from an incoming trunk. Target lines are used to answer incoming calls but cannot be used to make outgoing calls.

Auto-answer loop start and E&M trunks, and DID trunks, provide automated routing of calls to different destinations depending on the digits dialed. The destination is usually a target line (a virtual line) that can be assigned to telephones in the same way as a physical line. Target lines provide for attendant by-pass (calling directly to a specific department or individual) and line concentration (one trunk can fan out into many target lines).

The digits received on an incoming trunk may be:

- received from a Central Office (in the case of DID)
- received from a PBX (in the case of E&M)
- dialed by a remote user after having received system dial tone (in the case of auto-answer loop start, auto-answer E&M trunks or DID trunks).

By default, no target lines are assigned. However, if auto-answer trunks are used in the system, you can assign target lines to sets in the same way that other lines are assigned (in 2.Line Access of Configuration).

Target lines are referred to by line numbers in the same way as physical lines.

Remote system access

The remote access feature allows callers elsewhere on a private network, or on the public network, to get access to a Norstar system by dialing directly without going through an attendant. Once on the system, the remote user can use some of the system's resources.

Norstar systems with at least one Trunk Module support remote system access on the following trunk types which may require the remote caller to enter a password for Direct Inward System Access (DISA):

- auto-answer loop start trunks
- auto-answer E&M trunks
- DID trunks (by means of the DISA DN).

The system resources (dialing capabilities, Line Pool access and feature access) that a remote user may access depends on the Class of Service assigned to them. You can refer to the description of Class of Service in the Administration chapter for more details.

Remote access on loop start and E&M trunks

Loop start trunks provide remote access to Norstar from the public network; E&M trunks provide remote access from a private network. Each must be configured to be auto-answer (in **Trunk data** programming) to provide remote system access.

A loop start trunk **must** have disconnect supervision if it is to operate in auto-answer mode. E&M trunks always operate in disconnect supervised mode.

Auto-answer with DISA

When a caller dials in, the system answers with stuttered dial tone. This is the prompt to enter a Class of Service (COS) password which determines which system capabilities are available to the caller.

Auto-answer without DISA

When a caller dials into the system, the system answers with system dial tone and no COS password is required. In this case, control over the system capabilities available to the caller is provided only by the Class of Service assigned to the incoming line.

Remote access on E&M trunks connected to a private network

Nodes on the private network deliver the last dialed digits to the destination Norstar node, for interpretation by the destination Norstar node. The destination Norstar node either matches the digits to a target line or interprets the digits as a remote feature request. The call is either routed to the specified target line, or the remote feature is activated.

Auto-answer E&M trunks connected to a private network

By default, E&M trunks are set to answer with DISA. For auto-answer E&M trunks connected to a private network, change the default so that the trunks are **not** answered with DISA.

If an auto-answer E&M trunk is configured to answer with DISA, the system tries to interpret any received digits as a COS password.

Auto-answer with the DISA DN and the Auto DN

The DISA DN and the Auto DN allow auto-answer private network and auto-answer DID calls, in the same way that calls on auto-answer loop start and auto-answer E&M trunks can be answered, with or without DISA. These DNs are described in 4. Miscellaneous programming.

Remote access on Direct Inward Dial (DID) trunks

Remote system access on DID trunks is similar to that of E&M trunks connected to a private network. The main differences are:

- a remote caller is on the public network dialing standard local or long-distance telephone numbers
- the digits received are delivered by the Central Office (CO)
- DISA cannot be administered to a DID trunk.

As with a private network, the dialed digits may be programmed to match those of a specific target line DN or Remote Feature DNs (the DISA DN and the Auto DN).

Copying Trunk and Line data

At the **Show line:** _ prompt a COPY button appears. This allows you to copy programming from one line to other lines.

Copying data from different types of Trunk Cartridges (TC)

Copying lines between different trunk types (for example, from a Loop Start TC to an E&M TC) triggers the prompt

Reset nnn-mmm?, along with the display buttons YES and NO.

This is because all trunks on a given TC must be of the same type. Changing the trunk type for one line on a TC changes all lines on the same TC.

Note: "nnn-mmm" is the number range for the lines in the Trunk Cartridge to which the data is to be copied.

Copying limitations

- when copying data for an E&M line to a loop start line or a DID line, if you reset the new line to E&M (in response to the prompt), the first two lines in the changed TC are E&M and the last two lines DTMF (see the description of E&M Trunks).
- in copying data from a physical trunk to a target line (or the other way around), only the data in common is copied. For example, copying a target line to an E&M trunk copies only the Line data settings because there are no Trunk data settings for a target line.
- the Received number (**Rec'd #:**) of a target line is a unique number and cannot be copied.
- the two lines on E&M TCs reserved for DTMF receivers cannot be copied to another line type (see the section on E&M TCs for a description of E&M and DTMF lines).
- You can copy data to KSU lines 001 to 008 only from loop start lines.

Trunk data

Trunk Data settings apply to physical lines (001 to 080), and **not** to target lines (081 to 184). Some Trunk Data settings may not appear on the display during programming depending on the type of trunk. Those that appear for a given Trunk type are indicated in the table below.

Note: Target lines do not have any Trunk data settings. For target lines, the physical connection information consists of the received digit string (Rec'd #:) used to access the target line.

Trunk data prompts that appear for a given Trunk type

Prompt	Loop start	E&M	DID	DTMF
Line<nnn>:	Yes	Yes	Yes	Yes
Trunk mode:	Yes	—	—	—
Ans mode:	Yes	Yes	—	—
Ans with DISA:	Yes	Yes	—	—
Signal:	—	Yes	Yes	—
Gain:	—	Yes	—	—
Dial mode:	Yes	Yes	—	—
Full AutoHold:	Yes	—	—	—

Line<nnn>

The Line setting specifies the trunk type for a line. Use the **CHANGE** display button to select the setting: **Loop**, **E&M** (or **DTMF**) and **DID**.

Loop is the default setting used for loop start trunks (for Loop Start and CI Trunk Cartridges), and for KSU loop start lines (001 to 008).

E&M is for the first two line numbers on an E&M Trunk Cartridge.

DTMF is for the two last lines on an E&M cartridge. You must not assign DTMF receiver line numbers to telephones. If you do, the lines appear at the telephone as out of service.

DID is for a Direct Inward Dialing (DID) Trunk Cartridge.

Programming hints

- E&M Trunk Cartridges have two E&M lines and two DTMF receivers (instead of four lines as in a loop start cartridge). For example, if an E&M Trunk Cartridge has the range of line numbers 009 to 012, numbers 009 and 010 are E&M lines, and numbers 011 and 012 are the DTMF receivers. The display prompt for line 010 appears as **Line010:E&M** and for line 011 appears as **Line011:DTMF**.
- After you change a Trunk type setting (or after you use the **COPY** display button to copy Line programming) you are prompted to confirm that you want to reset the Trunk type for all trunks supplied by the TC, since all trunks on the same TC must be of the same type. You must press the **YES** display button for a changed or copied Trunk setting take effect.

Note: Changing the settings for Trunk Cartridge type (that is, loop start, E&M or DID) on a system in use, may cause lines to be disabled and calls to be dropped.

Trunk mode

Trunk mode lets you specify one of two modes of operation for each line: disconnect supervision or unsupervised. Disconnect supervision, also referred to as loop supervision, releases an external line when an Open Switch Interval (OSI) is detected during a call on that line. This prevents the line from remaining unavailable for other Norstar users.

Use the **CHANGE** display button to select the setting: Super or **Unspr.**

Super assigns supervised mode, if supported by the Norstar hardware; otherwise, unsupervised mode is assigned.

Unspr (the default) turns disconnect supervision OFF for the line.

Programming hints

- The Trunk mode setting is used only for loop start lines on a Trunk Cartridge or in the KSU.
- The duration of an OSI before Norstar disconnects a call is programmed in the Supervision setting of Miscellaneous programming.
- For loop start trunks to operate in auto-answer mode, disconnect supervision is required.

Answer mode

The Answer mode prompt appears on the display during programming for loop start lines if the Trunk mode setting was Super, and for E&M lines. The prompt is suppressed for DID programming. Use the **CHANGE** display button to select the setting: **Manual** or Auto.

Programming hints

- Remember that disconnect supervision is required if loop start trunks are to operate in auto-answer mode.
- You should change the Answer with DISA setting to **N**, for E&M trunks in a private network operating in auto-answer mode. The default (**Ans with DISA: Y**) causes the system to expect a Class of Service password after it automatically answers a trunk.

Answer with DISA

When activated, the Answer with DISA setting specifies that a trunk is answered with stutter dial tone. Use the **CHANGE** display button to select the setting: **Y (Yes)** or **N (No)**.

Programming hints

- This setting is displayed during the programming of loop start and E&M lines if Answer mode was set to Auto. The prompt is suppressed during DID programming.

Signal

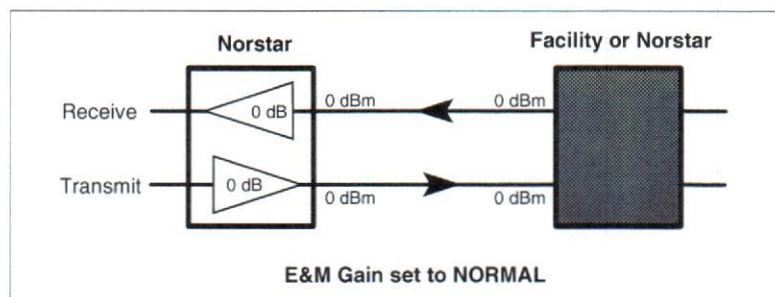
Use the **CHANGE** display button to select the setting: **WinkStart**, **Immediate** and **DelayDial**.

Programming hints

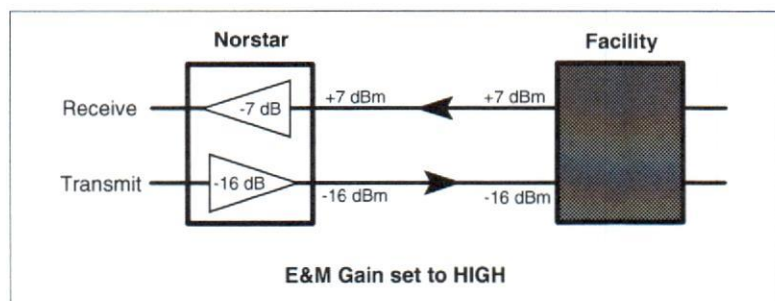
- The Signal setting appears on the display only for E&M or DID programming.
- Make sure that this matches the signal type programmed for the trunk at the other switch.

Gain

Use the **CHANGE** display button to select the setting: **Normal** or **High**. The default value **Normal** induces zero loss. Use it when the E&M trunks are connected to facilities that present 0 dBm at the interface, for both the transmit and receive paths.



The value **High** induces 7db of loss in the receive path and 16db of loss in the transmit path. Use it when the E&M trunks are connected to facilities that present +7 dBm in the receive path, and -16 dBm in the transmit path, at the interface.



Programming hints

- Control over the gain (transmission levels) can be set for E&M trunk programming only.

Dial mode

The Dial mode setting appears on the display only for loop start and E&M trunk programming. Dial mode lets you specify whether Dual Tone Multi-Frequency (DTMF) or Pulse signalling is used on the trunk. Use the **CHANGE** display button to select the setting: **Pulse** or **Tone**.

Full Autohold on idle line

Full Autohold on idle line is a variation of the Automatic Hold feature. If you select an idle line, but do not dial any digits, that line is automatically placed on hold if you then select another line. Use the CHANGE display button to select the setting: **N (No)** or **Y (Yes)**.

The line you first selected is held until you press its button. The line is not available for use by anyone else.

Programming hints

- A prompt for Full AutoHold appears only during loop start trunk programming. Full AutoHold is always in place for E&M trunks; it has no meaning for incoming-only DID trunks.
- The default setting should be changed only if Full Autohold is required for a specific application.

Received number

The Received number setting applies only to target lines (line numbers 081 and higher). It allows you to specify the digits which make a specific target line ring. The default value is no digits specified.

Use the button, the CHANGE display button, and the dial pad to program the digit string for each target line.

Programming hints

- The length of a **Rec'd #:** can be one to seven digits (programmed in System Data); the default is three digits.
- Received numbers must be unique among target lines, the Auto DN, the DISA DN and the Line Pool access codes.

Line data

Line data programming can be applied to all lines, trunks and target lines:

- lines 001 to 032 (trunks) and 081 to 120 (target line) for a Two-port Expansion Cartridge.
- 001 to 080 (trunks) and 081 to 184 (target lines) for a Six-port Expansion Cartridge.

Line type

This setting specifies how the line is to be used in relation to other lines in the system. Use the **CHANGE** display button to select the setting: **Public**, Private to:, or Pool (A to O, representing 15 line pools).

A **Public** line can be accessed by more than one telephone.

A **Private** line can be assigned only to one telephone and the Prime Telephone for that line. Use the **CHANGE** display button and the dial pad to enter the internal number of the telephone.

Pool assigns the line to one of the fifteen line pools. If a line is assigned to a line pool, but is not assigned to any telephone, that line is available only for outgoing calls.

Programming hints

- Line pools must NEVER contain a mixture of loop start lines and E&M lines.
- All lines in a given line pool should always go to the same location.
- There are two more programming settings that must be assigned before a line pool can be used:
 - You must assign Line Pool access to telephones in the Line Access section of Configuration programming.
 - You must assign system-wide Line Pool access codes in the Miscellaneous section of Configuration programming.
- A telephone can be administered to search automatically for an idle line from several lines appearing on the telephone. Assign a line pool as the Prime line (in **2. Line Access, Prime line**) and all the lines in the line pool must appear on that telephone. When the user lifts the receiver, or presses handsfree, any one of the lines, if idle, can be selected by Automatic Outgoing Line selection.
- Develop a unified dialing plan for line pools where Norstar systems are networked together. It may be appropriate to provide a single line pool with E&M lines for use by all callers on the network.
- If you plan to program the Prime line to the Intercom (I/C) setting, you may wish to assign loop start lines to the first line pools. Remember that when the system searches for an outgoing line, it begins at Line Pool A and chooses the first available line.
- Assigning a single E&M trunk to a line pool allows features like Ring Again on Busy Line Pool to help manage access to a shared resource.
- Target lines cannot be assigned to a line pool.

Prime Telephone

This feature allows you to assign a telephone to provide backup answering for calls on the line. Unanswered calls are redirected to the Prime telephone. Use the **CHANGE** display button and the dial pad to enter the internal number of the Prime telephone.

Programming hints

- For auto-answer trunks, calls ring only at the Prime telephone for a trunk, and only when overflow call routing is active.
- Each line can be assigned only one Prime telephone.

Auxiliary Ringer

This setting allows you to turn the Auxiliary Ringer ON or OFF. When turned ON, the Auxiliary Ringer ring for any incoming calls that ring on the line. The Auxiliary Ringer is an optional device that must be connected by the Installer. Use the **CHANGE** display button to select the setting: **Y (Yes)** and **N (No)**.

Programming hints

- For auto-answer trunks, calls ring only at the Prime telephone for a trunk, and only when overflow call routing is active.
- An Auxiliary Ringer can be programmed, in the Service Modes section of Administration programming, to ring for a line placed into a Service Mode. An Auxiliary Ringer can also be programmed to ring for calls to a telephone. See the System Coordinator Guide for more information.

Privacy

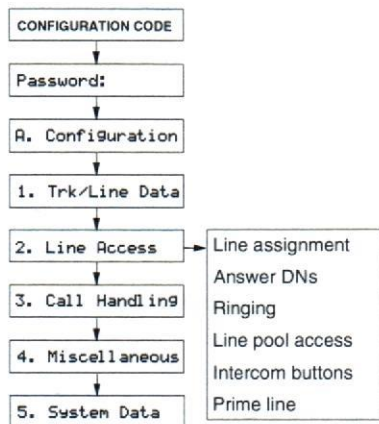
This feature controls whether one Norstar user can select a line in use at another telephone to join an existing call. The default setting is Privacy ON, so that nobody with a Norstar telephone can press a line appearance on their telephone to join a call in progress at another telephone. Use the **CHANGE** display button to select the setting: **Y (ON)** and **N (OFF)**.

Programming hints

- Privacy can also be turned ON and OFF during a call with the Privacy feature code.

Line Access

When you are finished programming Line Access settings for one telephone, you can copy those settings to other telephones.



Line assignment

This setting allows you to assign physical trunk lines and target lines to each telephone. Target lines are assigned and removed in the same manner as other lines. Use the button, the **ADD** display button, and the dial pad to program the line numbers each telephone can access.

Programming hints

- The default line assignments depend on the system template assigned during System Startup. The line assignment defaults for the default template (Square) are lines 001 and 002 to all telephones.
- In general, auto-answer loop start trunks, auto-answer E&M trunks and DID trunks are not assigned to telephones. If assigned, they are used for monitoring incoming call usage, or for making outgoing calls (auto-answer loop start and E&M trunks).
- You cannot add a line that is private to another telephone.
- Each line assigned to a telephone must appear at a button with an indicator on that telephone. The maximum number of line buttons are:
 - 8 for the M7208 Telephone
 - 10 for the M7310 Telephone
 - 24 for the M7324 Telephone
- The M7100 Telephone is an exception; it has no line buttons and can be assigned any number of lines.
- A Central Answering Position (CAP), with one or two CAP modules, can provide extra line buttons if more than 12 lines are assigned to the M7324 Telephone. The remaining lines appear at buttons on the first CAP module.

Answer DNs

Calls for other Norstar telephones can appear and be answered at the telephone being programmed. The DNs of the other telephones are referred to as Answer DNs. One to four Answer DNs may be assigned to the telephone being programmed. Use the button, the **ADD** display button, and the dial pad to program the line numbers each telephone can access on an Answer button.

Programming hints

- Every Answer DN assigned to the telephone automatically assigns an Answer button with an indicator to the telephone. These buttons should be labeled accordingly, identifying the telephone with its name or DN.
- More than one telephone can have an Answer button for the same DN. In this way, more than one telephone can provide call alerting and call answering for any calls directed to that DN.
- A Private line does not generate alerting at an Answer button.

Ringing

This setting allows you to choose:

- which lines (including target lines), on the telephone being programmed, rings for an incoming call.
- which Answer DNs, on the telephone being programmed, rings for an incoming call.

If auto-answer loop start trunks, auto-answer E&M trunks or DID trunks are assigned to a telephone, the ringing preference has an effect only when overflow call routing or callbacks associated with overflow call routing occur. The ring/no ring setting has no effect on incoming calls on the trunks that are being routed to target lines.

Use the button to display the line you want to program ringing for. Use the **CHANGE** display button to select the setting: **Ring** and No ring.

Programming hints

- Refer to Startup for default line ringing assignments in the the Square, Centrex, Hybrid and PBX system templates.
- Ensure that lines assigned to an M7100 Telephone Ring; otherwise incoming calls on the lines cannot alert at the telephone.
- You cannot program Ringing if there are no lines or Answer DNs assigned to the telephone.

Line Pool access

This setting allows a telephone to access one or more of the fifteen line pools available (A to O). When you assign "yes" for a given line pool, the telephone being programmed can access any lines in that line pool.

Use the button to display the line pool you want to program access to. Use the **CHANGE** display button to select the setting: **N (No)** and **Y (Yes)**.

Intercom buttons

This setting assigns the number of Intercom buttons to a telephone. Intercom buttons provide a telephone with access to internal lines. Use the **CHANGE** display button to select the setting: 0, 1, 2, 3, 4, 5, 6, 7, or 8.

Programming hints

- Each Intercom button assigned during programming automatically appears on the telephone. The buttons start with the lower right-hand button, or one button above if the Handsfree/Mute feature was assigned to the telephone.
- Two Intercom buttons are required for establishing a conference call with two other Norstar telephones.
- Only one Intercom button is required if internal calls are to be made or received on the telephone, and line pools are to be accessed.
- The M7100 Telephone default assignment of two Intercom buttons cannot be changed. These buttons do not appear on the telephone.

Prime line

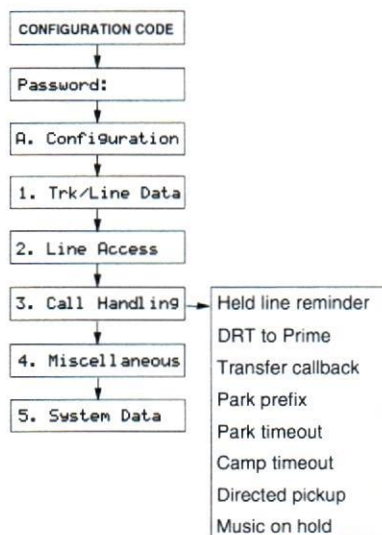
This setting assigns a Prime line to the telephone. A Prime line is the first line that is automatically selected when a call is made from a Norstar telephone. Use the **CHANGE** display button to select the setting: **None**, a line number, Pool (A to O), and I/C. (Only assigned lines and line pools appear.)

Programming hints

- An assigned Prime line is not associated with the assignment of a Prime telephone.
- An external line must be assigned to the telephone in Line assignment before it can be assigned as the Prime line to the telephone.
- A line pool must be assigned to the telephone in Line Pool access before a line pool can be assigned as the Prime line to the telephone.
- A target line cannot be a Prime line for a telephone because it is incoming-only.
- A DID line should not be assigned as the Prime line for a telephone. If assigned, it is treated as if no Prime line has been assigned. The message **Select a line** appears when the receiver is lifted.
- Remember that if you set Prime line to Intercom (I/C), you may wish to assign loop start lines to the first line pools. Remember that when the system searches for an outgoing line, it begins at Line Pool A and chooses the first available line.
- By assigning a line pool as a Prime line, a telephone can be made to search automatically for an idle line in a pool. This is described in the section on programming Line type (1. Trk/Line Data, Line data).

Call Handling

Call Handling allows you to program system-wide characteristics. These characteristics are not associated with any specific line or telephone.



Held Line Reminder

When active, Held Line Reminder reminds you that a call at your telephone is still on hold. You periodically hear two tones from your telephone until you return to the call on hold. Use the **CHANGE** display button to select the setting: **N (No)** or **Y (Yes)**.

Held Line Reminder delay

Held Line Reminder delay allows you to choose the number of seconds before the Held Line Reminder feature begins at a telephone that has an external call on hold. Use the **CHANGE** display button to select the setting: 30, **60**, 90, 120, 150, or 180 seconds.

Programming hints

- The Held Line Reminder delay can be programmed only if Held Line Reminder is activated.

Delayed Ring Transfer

Delayed Ring Transfer automatically forwards unanswered external calls to a Prime telephone, after a certain period of time. This helps ensure that no external call goes unanswered. Use the **CHANGE** display button to select the setting: **Y (Yes)** or **N (No)**.

Programming hints

- An operational Prime Telephone must be assigned before this feature can operate. A Prime Telephone is assigned to one or more external lines in the Line Data section of Configuration programming.

Delayed Ring Transfer delay

Delayed Ring Transfer delay allows you to specify the number of rings before Delayed Ring Transfer transfers a call to a Prime telephone. Use the **CHANGE** display button to select the setting: 1, 2, 3, 4, 6, or 10 rings.

Programming hints

- The Delayed Ring Transfer delay can be programmed only if Delayed Ring Transfer is activated.
- You can estimate the delay in seconds if you multiply the number of rings by six.

Transfer Callback delay

Transfer Callback delay allows you to specify the number of rings before a Callback occurs on a transferred call. Use the **CHANGE** display button to select the setting: 3, 4, 5, 6, or 12 rings.

Programming hints

- You can estimate the delay in seconds if you multiply the number of rings by six.

Park prefix

The Park prefix is the first digit of the call park retrieval code that must be entered to retrieve a parked call. If the Park prefix is set to None, calls cannot be parked. Use the **CHANGE** display button to select the setting: 1 to 9, N (None), or 0.

Programming hints

- The Park prefix cannot be the same as:
 - the Direct-dial digit
 - the External Line access code
 - the first digit of a DN
 - the first digit of a Line Pool access code.

Other programmable settings may affect which numbers appear on the display during programming. Although the numbers 0 to 9 are valid Park prefix settings, some may have been already assigned elsewhere by default or by programming changes. (To avoid a conflict, refer to the table of default settings in the description of External code.)

- If DN length is changed, and the changed DNs conflict with the Park prefix, the setting changes to **None**.

Park timeout delay

Park timeout delay allows you to assign the number of seconds before a parked call on an external line returns to the originating telephone. Use the CHANGE display button to select the setting: 30, **45**, 60, 90, 120, 150, 180, 300, or 600 seconds.

Camp timeout delay

Camp timeout delay allows you to assign the number of seconds before an unanswered camped call is returned to the telephone which camped the call. Use the CHANGE display button to select the setting: 30, **45**, 60, 90, 120, 150, or 180 seconds.

Directed pickup

Directed pickup allows you to answer any calls by specifying the ringing telephone's internal number. Use the CHANGE display button to select the setting: **Y (Yes)** or **N (No)**.

Programming hints

- Directed pickup is not to be confused with the Call Pickup Group feature in Administration programming, which allows you to answer a call at any telephone within a specific group without specifying the internal number of the ringing telephone.
- Like Call Pickup Group, Directed pickup is useful when not all the telephones have been assigned the same lines, but you still want to allow your co-workers to answer a call on any external line from their telephones.

On hold

On hold allows you to choose what a caller hears on an external line when the line has been put on hold. Use the **CHANGE** display button to select the setting: **Tones**, Music, or Silence.

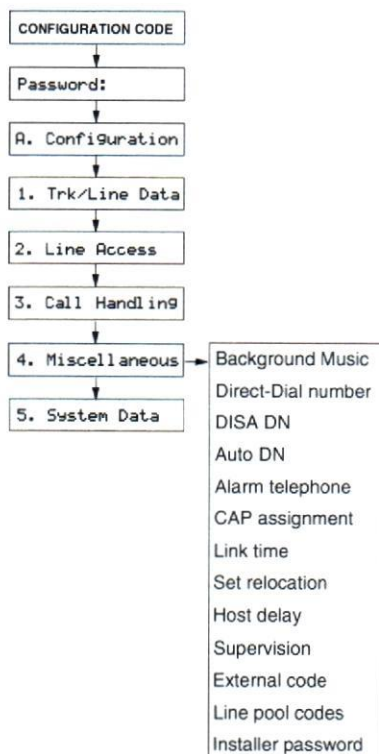
Tones provides a periodic tone.

Music provides any signal from a source such as a radio connected to the KSU.

Silence provides no audio feedback.

Miscellaneous

Miscellaneous allows you to program system-wide characteristics. These characteristics are not associated with any specific line or telephone.



Background Music

Background Music allows you to listen to music through your telephone speaker. A music source must be connected to the Key Service Unit. Use the **CHANGE** display button to select the setting: **N (No)** or **Y (Yes)**.

Direct-dial digit

Direct-dial digit allows you to dial a single system-wide digit that can be used to call a specific telephone, called a Direct-dial telephone. Use the **CHANGE** display button to select the setting: 0 to 9, or N (None).

Programming hints

- There can be as many as five Direct-dial telephones in a system. The Direct-dial telephone to which specific telephones connect is assigned in Administration (**4. Direct-Dial** and **5. Capabilities**).
- People with common interests should be in the same Direct-dial group. For instance, the secretary who can best handle calls or questions for a group could have a telephone assigned as the Direct-dial telephone for that group.
- Another Direct-dial telephone, an Extra-dial telephone, can be assigned for each Service Mode in Service Modes programming.
- The Direct-dial digit **cannot** be the same as:
 - the first digit of a DN
 - the first digit of a Line Pool access code
 - the External Line Access code
 - the Park prefix

To avoid a conflict, refer to the table of default settings in the description of External code.

- If DN length is changed, and the changed DNs conflict with the Direct-dial digit, the setting changes to N.

Direct Inward System Access Directory Number (DISA DN)

For calls answered with DISA, the system presents a stuttered dial tone to prompt a caller to enter a valid password. The Class of Service (COS) that applies to the call is determined by this COS password.

Once a remote user is on the Norstar system, the DISA DN can be used to change the existing Class of Service.

Use the **CHANGE** display button and the dial pad to enter the digits to be received from the auto-answer trunk. Use the

button to set the DISA DN to **None**.

Programming hints

- The length of the DISA DN is the same as the **Rec'd # length** specified in **5. System Data**. The DISA DN is cleared if the Received number length is changed.
- The DISA DN cannot conflict with any target line DNs, and cannot have a first digit that conflicts with the first digit of a Line Pool access code or with the External Line access code.

Auto Directory Number (Auto DN)

For calls answered without DISA, no password is required to access the Norstar system. The Class of Service (COS) that applies to the call is determined by the COS for the trunk on which the user is calling.

Use the **CHANGE** display button and the dial pad to enter the digits to be received from the auto-answer trunk. Use the

button to set the Auto DN to **None**.

Programming hints

- The length of the Auto DN is the same as the **Rec'd # length** specified in **5. System Data**. The Auto DN is cleared if the Received number length is changed.
- The Auto DN cannot conflict with any target line DNs, and cannot have a first digit that conflicts with the first digit of a Line Pool access code or with the External Line access code.

Alarm telephone

Alarm telephone allows you to assign a telephone on which Alarm messages appear when a problem has been detected in the system. Use the **CHANGE** display button and the dial pad to enter the internal number of the Alarm telephone. Use the button to set the Alarm telephone to **None**. The default setting is **221**.

CAP (Central Answering Position) assignment

This setting designates a telephone as a CAP. The CAP must be an M7324 Telephone, and may have one or two CAP modules attached. A maximum of five CAPs can be installed in a Norstar system.

The CAP may be used to:

- monitor the busy/not busy and Do Not Disturb status of Norstar telephones
- answer external calls on up to 120 lines, and extend calls to other Norstar telephones
- send up to 30 messages to other Norstar telephones
- provide up to 96 extra memory buttons for the M7324 Telephone.

Use the button, the **CHANGE** display button and the dial pad to enter the internal number of the M7324 Telephone to be designated a CAP.

Programming hints

- If CAP modules are attached to an M7324 Telephone that has not been programmed as a CAP, then no CAP settings are assigned.
- If a CAP module (or modules) is relocated with the M7324 Telephone, the settings are retained.

Link Time

Link Time allows you to specify the duration of a signal required to access a feature through a remote system. Use the **CHANGE** display button to select the setting: 100, 200, 300, 400, 500, **600**, 700, 800, 900, or 1000 milliseconds.

For example

External dialing must reach through a Centrex system. The Centrex system requires a Link Time of 400 ms. Program a Link Time of 400.

Programming hints

- The Link Time required depends on the requirements of the host switching system that must be accessed.
- Link is another name for recall or flash.

Telephone Relocation

Telephone Relocation allows you to move any telephone to a new location within the Norstar system without losing Personal programming, and any Configuration and Administration programming for that telephone. Use the **CHANGE** display button to select the setting: **N (No)** and **Y (Yes)**.

Programming hints

- It is advisable to activate Telephone Relocation after the telephone installation and programming has been done. This provides you with more flexibility in testing equipment.
- If this feature is deactivated while a telephone is moved, that telephone's internal number and Administration data remain with the physical port on the KSU, and the telephone does not receive the original programming when it is reconnected elsewhere.

Host delay

Host delay lets you assign the delay between the moment an outgoing line is selected to make an external call (by lifting the receiver off the telephone, for example) and the moment that Norstar sends dialed digits or codes on the line. Use the CHANGE display button to select the setting: 200, 400, 600, 800, **1000**, 1200, 1400, 1600, 1800, or 2000 milliseconds.

Programming hints

- Host delay is provided to ensure that a dial tone is present before the dialing sequence is sent. Minimizing this delay provides faster access to the requested features.

Disconnect Supervision delay

Disconnect Supervision delay allows you to specify the duration of an Open Switch Interval (OSI) before the Disconnect (or loop) Supervision feature disconnects a call on a supervised external line. Use the CHANGE display button to select the setting: 60, 100, 260, **460**, or 600 milliseconds.

Programming hints

- Disconnect Supervision is assigned to each line with the Trunk mode setting in the Line Data section of Configuration programming.

External code

External code allows you to assign the External Line access code. This code is used to allow M7100 Telephones and Analog Terminal Adapters (ATA) to access external lines.

Use the CHANGE display button and the dial pad to program the single digit access code. The default access code is **9**.

Programming hints

— The External Line access code cannot conflict with:

- the Park prefix
- the Direct-dial digit
- the first digit of a Line Pool access code
- the first digit of a DN

If DN length is changed, and the changed DNs conflict with the External Line access code, the setting changes to **None**.

Digits assigned by default to Configuration settings

Digit	Use	Heading
0	Direct-dial #	4. Miscellaneous
1	Park prefix	3. Call handling
2	the first digit of B1 DNs	5. System Data
3	the first digit of B1 DNs in an expanded system	5. System Data
9	External Line access code	4. Miscellaneous
— —	Line Pool access code (Not assigned by default, but takes precedence over the External Line access code if there is a conflict.)	4. Miscellaneous

Line Pool access codes

This setting allows you to assign a Line Pool access code for each of the fifteen line pools (A to O). These codes are used to specify the line pool you wish to use for making an outgoing external call.

Use the button, the **CHANGE** display button, the dial pad, and the **OK** display button to program the access code. The default access code is blank.

Programming hints

- The code can be one to four digits in length. Line Pool access codes starting with the same digit must be the same length.
- A Line Pool access code can be the same as an external line access code. In this case, the Line Pool access code takes priority over the external line access code, and a line from the line pool is selected.
- A Line Pool access code cannot conflict with:
 - the Park prefix
 - the Direct-dial digit
 - the first digit of any Received number
 - the first digit of any DN (including the Auto DN or the DISA DN).
- To avoid a conflict, refer to the table of default settings in the description of External code.

Installer password

This setting allows you to change the Installer password that allows access to Configuration programming.

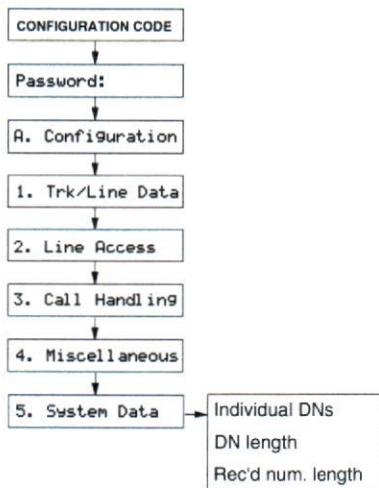
Use the CHANGE display button, the dial pad, and the OK display button to program the Installer password.

Programming hints

- You can choose any combination of one to six digits. It is easier to remember the password if the digits spell a word. Provide this password only to selected personnel to prevent unauthorized access to Configuration programming. The implications of such access may include the rearrangement of line assignments, which could affect the operation of the Norstar system.
- The default Installer password is **266344 (CONFIG)**.

System Data

System Data allows you to specify system-wide settings.



Individual DNs

Individual DNs allows you to change the Directory Number (DN) or internal number of a telephone.

CAUTION

Changing an individual DN locks the Configuration session into the System Data programming mode. When the System Data session ends, re-enter the Configuration access code and the Installer password to continue with other Configuration or General Administration programming.

Do not perform Startup again, or all previous programming will be erased.

Use the button, the dial pad, and the OK display button to identify the DN you want to change. Then, use the dial pad, and the OK display button to enter the new DN.

Programming hints

- No DN changes occur until the Configuration session ends.
- If the "new DN" already exists for another telephone, that other telephone is given the "old DN".
- All DNs must be the same length.
- The first digit of a new DN cannot be the same as the first digit of:

- an External Line access code
- a Line Pool access code
- the Park prefix
- the Direct-dial digit

To avoid a conflict, refer to the table of default settings in the description of External code.

- The lowest default DN for a non-expanded system is 21, and the lowest default DN for an expanded system is 221.

DN length

This feature allows you to change the number of digits for all internal DNs. The maximum length is seven. The default and minimum length is three for an expanded (with Expansion Cartridge) Norstar system, and two for a non-expanded Norstar system.

Use the CHANGE display button to select the setting: **2**, 3, 4, 5, 6, or 7 for a non-expanded system; or **3**, 4, 5, 6, or 7 for an expanded system ('2' is not available for an expanded system).

Programming hints

- A non-expanded system (with a default DN length of 2) is automatically changed to a DN length of 3 after an expansion cartridge is installed and power is restored to the KSU.
- If any future expansion is planned, the DN length should be set to three, even on non-expanded systems.
- A DN length change, if required, should be the first programming change on a newly installed Norstar system.
- Each increase in length places the digit 2 in front of any existing DN. For example, if DN 3444 was increased to a length of 6, the new DN would be 223444.
- If the DN length is changed so that a conflict is created with the Park prefix, External Line access code, Direct-dial digit, or any Line Pool access code, the setting for the prefix or code is changed to **None**, and the corresponding feature is disabled.

CAUTION

You must wait for at least two minutes after a system startup before you change the DN length.

Data devices drop calls when the DN length is changed. (Data devices use the B2 channel. The M7100, M7208, M7310, and M7324 Telephones use the B1 channel. Calls are **not** dropped for these telephones.)

The DN length change is completed within two minutes, depending on the size of the installed Norstar system. System response may briefly slow down during this time. You cannot re-enter Configuration programming during this time. If you enter the Configuration access code, the message **In use: SYSTEM** appears on the display.

Received number length

The Received number length setting allows you to change the number of digits received on auto-answer trunks. These digits are used to identify target lines, Auto DN's, and DISA DN's. Use the **CHANGE** display button to select the setting: 1, 2, 3, 4, 5, 6, or 7. The default for a non-expanded system is **2**. The default for an expanded system is **3**. Then, use the button to enter the new Received number length.

Programming hints

- The target line number (for example, line 081) and the Received number for the target line (for example, **Rec'd #: 1234** for line 081) are two different numbers.
- The Received number length may be the same as the system DN length, or may, because of network or CO constraints, be set to some other value.
- A received number may be one to seven digits in length. The default length is three.
- Target lines are supported only on expanded Norstar systems. The **Rec'd #:** prompt does not appear when programming non-expanded Norstar systems.
- Changing the Received number length causes all programmed received digits to be cleared.

Set copy

Set copy allows you to copy programmed data from one telephone to another. You have two choices when deciding which data to copy:

- you can copy System data only;
- you can copy System data and Personal programming data.

System data is programmed in Configuration and Administration. Personal programming data is programmed by people at their own telephones, in order to customize their telephones to their own needs.

Remember:

- Set copy operates only from the Norstar M7310 or M7324 Telephones.
- Do not confuse Set copy with the COPY display button. COPY is more selective than Set copy. It allows you to copy specific groups of data from one telephone to another telephone or from one external line to another external line. You can copy more selective groups of System data listed in the table below by pressing COPY when it appears.
- **If you are copying both System data and Personal programming data, the source and destination telephones must each be the same Norstar model.** If you are copying System data only, the telephones can be different Norstar models.
- Copying data to a telephone overrides any of that telephone's previous programming.
- Know which data can and cannot be copied. These are shown in the following two charts.

System data

System data which CANNOT be copied	System data which CAN be copied	
Alarm Telephone designation	Answer button assignments	Line Pool access
CAP assignment	Automatic Handsfree	Line / Telephone Filter
Direct-dial Telephone designation	Autolog/Show Vmsg	Number of intercom buttons
Directory Number (DN)	Auxiliary ringer	Paging
Extra-dial Telephone designation	Call Forward No Answer	Page Zone
Log space	Call Forward No Answer Delay	Pickup Group
Service Modes Control Telephone designation for a line	Call Forward On Busy	Prime line designation
Service Modes Ringing Telephone designation for a line	Direct-dial Group	Priority Call permission
Prime Telephone designation for a line	First Display	Redirect Ring
Private line appearances	Full Handsfree	Ringing line preference
Telephone Name	Handsfree Answerback	Telephone Administration Lock
	Hotline	Telephone Filter
	Line assignment	

Personal programming data

Personal programming data which CANNOT be copied	Personal programming data which CAN be copied
Autobump	Dialing modes (Automatic Dial, Pre-Dial, Standard Dial)
Autolog options	Language Choice
CAP module memory button assignments	Line button positions
Contrast Adjustment	Personal Speed Dial entries
Log password	Telephone memory button assignments (Internal Autodial, External Autodial, and feature access)
Ring Type	
Ring Volume	

Applying Set copy

1. Access Configuration programming.
The display shows **A. Configuration**.
2. Press twice.
The display shows **C. Set copy**.
3. Press .
4. If you want to copy System data only, go to step 5.
OR
If you want to copy both System data and Personal programming data, press CHANGE.
5. Press .
6. Enter the internal number of the telephone from which you want to copy data.
7. Enter the internal number of the telephone to which you wish to copy data.
8. If you wish to copy the same data to another telephone, repeat step 7.
OR
To return to **C. Set copy**, press .
- OR**
To end the session, press .

Maintenance

A Maintenance session is a Norstar software feature that helps you quickly diagnose problems that may occasionally arise within the Norstar system.

A Maintenance session has six headings.

D. Maintenance



1. System Version



2. Port/DN Status



3. Module Status



4. Diagnostics



5. Sys Test Log



6. Sys Admin Log

System Version displays the version numbers of the two processors in your Norstar system.

Port/DN Status allows you to check and change the status of ports in your system.

Module Status allows you to check and change the status of modules in your system.

Diagnostics allows you to run a diagnostic test on ports in your system.

System Test Log displays a list of diagnostic test results, audits, event messages and alarm codes.

System Administration Log displays a list of system initializations, Configuration sessions, invalid password attempts and password changes.

You may run a Maintenance session from any working Norstar M7310 or M7324 Telephone. Only one person at a time can access a Maintenance session. Keep a pencil handy to record important information on photocopies of the Maintenance records. The Maintenance records are found at the end of this chapter.

Beginning a Maintenance session

1. Release all calls on your telephone.
2. Enter the Configuration access code:

Feature	*	*	C	O	N	F	I	G
---------	---	---	---	---	---	---	---	---

which is the same as

Feature	*	*	2	6	6	3	4	4
---------	---	---	---	---	---	---	---	---

The display shows **Password:**.
3. Enter the Installer password (the password does not appear on the display as you enter it). The default Password is **CONFIG (266344)**.

If the password is correct, the display shows

A. Configuration, and three triangular indicators ► appear on the vertical display between the rows of buttons.

If the password is incorrect, the display does not change. Check the password. Press **RETRY** and re-enter the password.

4. Place the *Norstar Programming Overlay* over the buttons pointed to by the indicators ►.
5. Press

Next

 three times until the display shows **D. Maintenance**.

System Version

System Version allows you to note the version numbers of the software in the two processors in your Norstar system:

- System Processor (SP) software, residing in the Feature Cartridge, and
- Real Time Processor (RTP) software, residing in the Key Service Unit (KSU).

Version numbers can be used to determine whether you have the latest software release, and to trace a software fault if one occurs. For instance:

- SP and RTP version numbers can indicate a Software Cartridge incompatibility.
- Trunk Cartridge and RTP version numbers can indicate a Trunk Cartridge incompatibility.
- SP and telephone version numbers can indicate a telephone version incompatibility.
- SP and functional terminal version numbers can indicate a functional terminal incompatibility.

To check the version number, start with the display showing

D. Maintenance:

1. Press .
The display shows **1.System Version.**
2. Press .
The display shows the version number of the SP.
3. Write the SP version number on the appropriate Maintenance record.
4. Press **RTP**.
The display shows the version number of the RTP.
5. Write the RTP version number on the appropriate Maintenance record.
6. Press .
The display returns to **1.System Version.**

Port/DN Status

Port/DN Status allows you to:

- identify any device or line connected to the system,
- check the version number of a device (an Analog Terminal Adapter, for example) for compatibility with the system,
- check the state of a device or line (for example, idle or busy), and
- disable or enable a device or line.

You can use Port/DN Status to:

- determine which port number corresponds to each DN,
- determine the port number of a malfunctioning device,
- determine if a malfunctioning device is incompatible with the Norstar system,
- disable a device before replacing it. This generates Norstar telephone display messages informing device users of what you are doing, and
- clear a hung line by disabling and enabling a line port.

Remember

You cannot disable the Norstar telephone from which you are accessing the Maintenance session. If you try to do this, a message appears on the display and you hear an error tone. Therefore, if you wish to disable that particular telephone, you will have to conduct the Maintenance session from another Norstar telephone.

CAUTION

You should not disable devices or lines when many people are using the Norstar system. Wait until after regular office hours.

Do **not** enable or disable ports at the following times:

- during the first two minutes after a System Startup, and
- before DS-30 cables are connected.

If you do so, incorrect ports may be enabled or disabled. To recover from this, disable then enable the affected modules using Module Status.

Examining Port/DN Status

Note: Port/DN Status allows you to check lines and devices on the system. Although the following procedures describe how to check devices, you can use the same procedures to check lines.

Identifying any device connected to the system

Start with the display showing **1.System Version:**

1. Press .

The display shows **2.Port/DN Status.**

2. Press .

The display shows **Show Port: _.**

3. On the dial pad, enter the port number of the device.

OR

Press DN, then enter the directory number of the device.

Device information appears (see the sample device identification display in the figure on the following page). This identifies the device connected to the B1 channel.

4. If there is an add-on device attached to a Norstar telephone such as a Central Answering Position (CAP) module or a Busy Lamp Field (BLF):

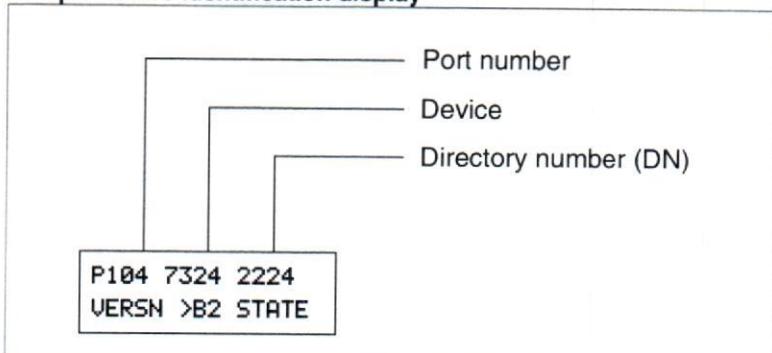
Press to view the add-on devices.

OR

If you want to identify the device connected to the B2 channel:

Press >B2.

5. Press twice to return to the display **2.Port/DN Status.**

Sample device identification display

Note: This sample display associates DN 2224 with port 104.

The following table lists some of the device types that may appear on the Norstar device identification display.

Explanation of device type

Display	Explanation
7100	M7100 Telephone
7208	M7208 Telephone
7310	M7310 Telephone
7324	M7324 Telephone
1: MODULE1	First add-on CAP module attached to an M7324
2: MODULE2	Second add-on CAP module attached to an M7324
ATA	Analog Terminal Adapter
BLF	Busy Lamp Field
CII	Call Identification Interface

Checking the version number of the device

From the Norstar device identification display:

1. Press VERSN (if it is available).

The display shows the version number of the device.

OR

The display briefly shows **Not available**, and then the previous display re-appears. In this case, you cannot record the version number.

2. If the display showed a device version number, write down this number on the appropriate Maintenance record.

To return to the Norstar device identification display from the display showing the version number:

1. If you want to retain the same port number:

Press OK.

OR

If you want to see information about the next higher port number (or DN if that is how you entered):

Press .

OR

If you want to see information about the next lower port number (or DN if that is how you entered):

Press .

Checking the state of the device

From the Norstar device identification display:

1. Press STATE.

The display shows one of the states listed in the table on the following page.

2. If you want, you can disable or enable the device (see the procedures in this chapter).

OR

If you want to return to the device identification display, press OK.

How the device state is shown on the display

Display	State of device
Busy DISABLE OK	The device is in use.
Disabling... OK	The device is being disabled.
Enabling... OK	The device is being enabled.
Idle DISABLE OK	The device is not in use.
Waiting for idle DISABLE OK	The device will be disabled as soon as it becomes idle.
Unequipped DISABLE OK	There is no device connected to that port.
Disabled by user ENABLE OK	The device has been disabled by someone running a Maintenance session.
Disabled by sys. ENABLE OK	The device has been disabled by the system because it is faulty or because a test is running.
Not available DISABLE OK	There is no state available.

Disabling the device when it becomes idle

When the display shows you that the device is busy:

1. Press **DISABLE**.
The display shows **Disable at idle?**
2. Press **YES**.
The device is disabled immediately after the user hangs up.

Note: If you disable a line on a Trunk Cartridge, the remaining three lines on that Trunk Cartridge are also disabled.

Note: If you choose the **Disable at idle?** option, but the device remains in use, you can disable the device immediately.

Disabling the device immediately

CAUTION

Make sure you inform people that you are going to disable their devices (or lines).

A device becomes disabled one minute after you press **YES** from **Disable at once?** The next two tables show examples of the sequence of messages that might appear on a telephone that you are disabling.

Examples of display messages

Disabling a line	Disabling a device
Please hang up testing line 016 45 seconds until disconnect Please hang up	Before disabling
	Please hang up Maintenance test 45 seconds until disconnect Please hang up
Not in service	After disabling
	In maintenance

To disable immediately when the display shows you that the device is busy:

1. Press **DISABLE**.
The display shows **Disable at idle?**
2. Press **CHANGE**.
The display changes to **Disable at once?**
3. Press **YES**.

The device prompts its user (described previously) and is disabled in one minute (or immediately, if the device is idle).

Enabling the device

When the display shows you that the device is disabled:

1. Press **ENABLE**.

The display briefly shows **Enabling...**. The device is immediately enabled and the display shows **Idle**.

Note: The display may briefly show **Enabling...**, then either **Disabled by sys.** or **Disabled by user.** In this case, the system is waiting to disable the module. This may occur after someone has run a Maintenance session and used either Module Status or Diagnostics. You cannot enable the device until its module has been disabled.

Returning to the beginning

From the display showing the state of the device:

1. Press **OK**.
2. Press .
3. Press again.
The display shows **2.Port/DN Status**.

Module Status

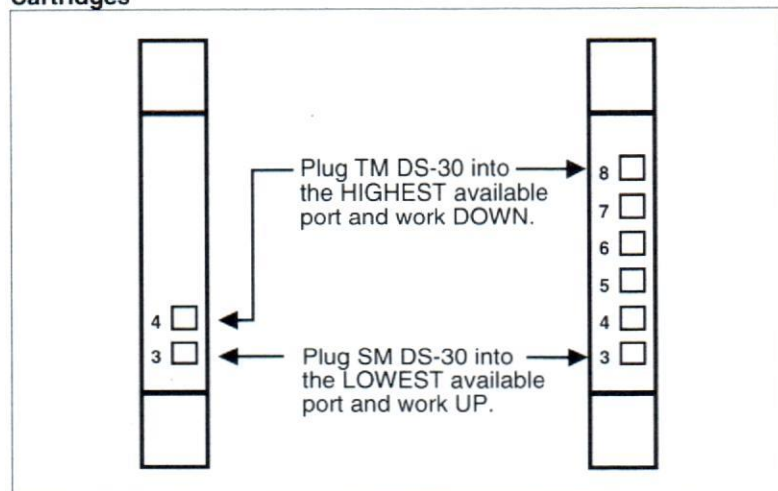
Module Status allows you to:

- look at the inventory of Station Modules (SMs), Trunk Modules (TMs), and modules inside the Key Service Unit (KSU),
- check the number of Trunk Cartridges (TCs) attached to each Trunk Module,
- check the state of the module or its cartridges, and
- disable or enable the module or its cartridges.

You may use Module Status to:

- isolate any malfunctioning modules, and
- disable a module before replacing it.

Module numbering schemes for Two-port and Six-port Expansion Cartridges



Note: Modules 1 and 2 are located inside the KSU.

Examining Module Status

Looking at the module inventory

Start with the display showing **2.Port/DN Status**:

1. Press .
The display shows **3.Module Status**.
2. Press .
The display shows **Show module: _**.
3. Enter the module number. Modules 1 and 2 are located inside the KSU. Refer to the figures on the previous page for the module numbering scheme.

OR

If you want to check the first module, press .

The display that you see is called the module inventory display.

If you choose module 1 or 2, the display shows how many telephones or lines are connected to the KSU.

If you are checking a Trunk or Station Module, the display shows either how many Trunk Cartridges are connected to the Trunk Module or how many devices are connected to the Station Module.

Note: Norstar devices may occupy both the B1 and B2 channels. This may increase the number of devices indicated on the module inventory display.

Checking the number of Trunk Cartridges attached to a TM

Start from the module inventory display, which shows the number of Trunk Cartridges connected to the module you chose (for example, 3 TCs on TM 4).

1. Press TC.

If there is no Trunk Cartridge in a slot, the display shows that zero lines are connected. If there is a Trunk Cartridge in a slot, the display shows that four lines are connected (for example, 4 lines on TC 1).

Note: If there is no Trunk Cartridge in slot number one (the left-most slot), the display shows that the module is empty.

2. If you want to check for Trunk Cartridges in the other two slots:
Press or .
3. Press MODULE to return to the module inventory display.

Checking the state of a TM

Start from the module inventory display, which shows the number of Trunk Cartridges connected to the module you chose (for example, 3 TCs on TM 4).

1. Press STATE.

The state of the module is shown on the display. Some examples of this display are shown on the following page.

2. If you want, you can disable or enable the module. (See the procedures in this chapter.)

OR

If you want to return to the module inventory display:
Press OK.

How the module or cartridge state is shown on the display

Example display	State of module or cartridge
3 sets busy DISABLE OK	There are three devices in use that are connected to the module or cartridge.
2 ports busy DISABLE OK	There are two ports in use that are connected to the module or cartridge.
4 lines busy DISABLE OK	There are four lines in use that are connected to the module or cartridge.
Disabling... OK	The module or cartridge is being disabled.
Enabling... OK	The module or cartridge is being enabled.
Waiting for idle DISABLE OK	The module or cartridge will be disabled as soon as it becomes idle.
Unequipped DISABLE OK	There is no module or cartridge connected to that DS-30 port.
Disabled by user ENABLE OK	The module or cartridge has been disabled from a Maintenance session.
Disabled by sys. ENABLE OK	The module or cartridge has been disabled by the system because it is faulty or because there is a test running.

Checking the state of a cartridge

Start from the display that shows the number of lines connected to the Trunk Cartridge you chose (for example, 4 lines on TC 1).

1. Press **STATE**.

The state of the cartridge is shown on the display. Some examples of this display are shown on the previous page.

2. To check the state of a Trunk Cartridge present in one of the other two slots:

Press or .

3. Disable or enable the cartridge. (See the procedures in the following two sections.)

OR

To return to the display showing how many lines are connected to the Trunk Cartridge:

Press **OK**.

Disabling the module or its cartridges

CAUTION

Use the Page feature to inform people using Norstar that you are about to disable a module. Mention that they may experience delays in the performance of their devices.

From the display showing the state of the module or cartridge:

1. Press **DISABLE**.
2. If the module or cartridge is not idle and you want to disable it when it becomes idle:

Press **YES**.

OR

To disable the module or cartridge immediately:

Press **CHANGE**, then press **YES**.

Enabling the module or its cartridges

From the display showing the state of the module or cartridge:

1. Press **ENABLE**.

The display briefly shows **Enabling...** The module or cartridge is immediately enabled. The display then shows the state of the module or cartridge.

Returning to the beginning

From any display showing the state of the module or cartridge:

1. Press **OK**.

2. Press twice.

The display shows **3.Module Status**.

Diagnostics

Diagnostics allows you to:

- select the connectivity test (test #100),
- identify which ports you wish to test,
- begin the test, and
- check the test results.

If you suspect that a voice connection may be broken, you can use Diagnostics to run the connectivity test. This test runs in three stages, stopping when any stage fails.

Stage 1 initializes any apparently empty ports and runs a sanity test to any device on that port.

Stage 2 disables the specified port and runs a write and read test.

Stage 3 disables both modules associated with the specified port and runs a write and read test.

Remember

Do **not** run the connectivity test:

- while ports or modules are being disabled, or
- during the first two minutes after a System Startup.

If you do so, the test may stop running with ports still disabled. To recover from this, power down, then power up the KSU.

CAUTION

The connectivity test may disrupt service as modules are disabled. Do not run this test when many people are using the Norstar system.

Running Diagnostics

Selecting the connectivity test

If you want to run the connectivity test while others are using the Norstar system, you should first inform them using the Page feature. Mention that they may experience delays in the performance of their devices.

Start with the display showing **3.Module Status:**

1. Press .
The display shows **4.Diagnostics.**
2. Press .
The display shows **Enter test#: _.**
3. Enter from the dial pad.
The display shows **Test Port: _.**

Identifying which ports you want to test

You can perform the connectivity test on a maximum of 16 ports.

Start with the display showing **Test Port: _:**

1. Enter all the port numbers from the dial pad, pressing **OK** after each entry.
2. Press .
The display shows you how many modules may be disabled when you run the test. The display then changes to **Begin test 100?**

Beginning the connectivity test

Start with the display showing **Begin test 100?:**

1. Press **YES.**
The display shows **Display results?**

Checking the test results

Start with the display showing **Display results?**

If you want to see the test results from the display:

1. Press **YES**.

The display shows **Running test 100**.

When the test is finished, the display shows the test results, for example, **P110 100-04**. In this case, port number 110 was the first port tested, and "04" is the result code of test 100. The result codes are explained in the table on the next page.

2. Press **MORE** if it appears as a display button. The test results for the next port number are shown.
3. Repeat step 2, if applicable.
4. Press **EXIT**.

You are returned to the display showing **4.Diagnostics**.

Note: If your Norstar telephone is connected to the module you test, it will be disabled. Run a new Maintenance session to see the results.

If you do not want to see the test results from the display:

1. Press **NO**.

The display briefly shows:

**For results see
Sys. Test Log**

Connectivity test results

Result code	Test results
00	You entered an invalid port number.
01	Stage 1 passed: The KSU device port is receiving signals properly. If the device has no voice connection, the problem is with the device.
02	Stage 1 passed: The KSU trunk port is receiving signals properly. If the trunk has no voice connection, the problem is likely with the external line, the 25-pair cable or the cross-connect.
03	Stage 1 passed: The Trunk Cartridge is receiving signals properly. If the trunk has no voice connection, the problem is likely with the TC, the external line, the 25-pair cable, or the cross-connect.
04	Stage 1 failed: There is no signaling to this KSU-based device, but other devices on the KSU work. The problem is likely with the TCM line, the device, the 25-pair cable to the KSU, or the cross-connect.
05	Stage 1 failed: There is no signaling to this SM-based device, but other devices on this SM work. The problem is likely in the TCM line, the device, the 25-pair cable to the SM, the cross-connect, or the SM.
06	Stage 1 failed: There is no signaling to any KSU-based device. The problem is likely with the 25-pair cable to the KSU or with the cross-connect.
07	Stage 1 failed: There is no signaling to any device on this Norstar bus. The problem is likely with the 25-pair cable to the module, the module, the DS-30 cable, or the Expansion Cartridge.
08	Stage 3 failed: A KSU-based fault was detected. Replace the KSU.
09	Stage 3 failed: A fault was detected in the Expansion Cartridge. Replace the Expansion Cartridge.

System Test Log

The System Test Log shows you a list of diagnostic test results, audits, event messages, and alarm codes. By using this feature you can:

- check the items in the log,
- check the current alarm (if there is one),
- check when each item in the log occurred,
- check the number of consecutive occurrences of an event or an alarm, and
- erase the log.

Note: The System Test Log holds a maximum of 20 items. You should check and record these items at regular intervals. Erase the log after dealing with all the items.

Examining the System Test Log

Checking the items in the log

Start with the display showing **4.Diagnostics**:

1. Press .
The display shows **5.Sys Test Log**.
2. Press .
The display shows **Start of new log** or **Start of log**.
3. Press or .
The display shows a log item.
4. Write down the item on the System Test Log record.
5. If the log item is an event message or an alarm code, refer to the Event messages section or the Alarm codes section in this chapter.
6. Repeat steps 3, 4, and 5 until you have recorded all the

Checking the current alarm

If you want to quickly check the highest severity alarm before viewing all the log items, start with the display showing **Start of new log** or **Start of log**:

1. Press ALARM.

The display shows an alarm code if there is a current alarm.

2. Press EXIT to return to the display **Start of log**.

OR

The display shows **No current alarm** and then shows **Start of new log** or **Start of log**.

Note: All alarms are recorded as items in the System Test Log.

Checking when each item in the log occurred

Start with any display showing a log item:

1. Press TIME.

The display briefly shows the date and time.

2. Write the date and time on the System Test Log record.

Checking the number of consecutive repetitions of an event or alarm

If REPEAT appears under a display showing a log item:

1. Press REPEAT.

The display shows the number of consecutive times the event or alarm occurred.

Erasing the log

If you want to erase the System Test Log, start with the display showing **Start of new log** or **Start of log**:

1. Press ERASE.

The display shows **Erase log?**

2. Press YES.

If no new items have been added since the list was entered, the log is erased and the display shows **Log is empty**.

OR

If new items have been added since the list was entered, the display shows **Log has changed**.

3. If the display shows **Log has changed**:

To show the new log, press .

OR

To return to **5.Sys Test Log**, press EXIT.

System Administration Log

The System Administration Log keeps a record of administrative events such as system initializations, Configuration sessions in which a change was made, invalid password attempts, and password changes. By using this feature you can:

- check the items in the log,
- erase the log, and
- check when each item in the log occurred.

Note: The System Administration Log holds a maximum of ten items. Erase the log after dealing with all the items.

Examining the System Administration Log

Checking the items in the log

Start with the display showing 5 Sys Test Log:

1. Press .
The display shows 6.Sys Admin Log.
2. Press .
The display shows Start of new log or
Start of log.
3. Press or .
The display shows a log item.
4. Write down the item on the System Administration Log record.
5. Repeat steps 3 and 4 until you have recorded all the items.

Checking the current alarm

Start with the display showing **Start of new log** or **Start of log**:

1. Press **ALARM**.
The display shows an alarm code if there is a current alarm.
2. To return to the display showing **Start of log**:
Press **EXIT**.

OR

The display shows **No current alarm** and then shows **Start of log**.

Erasing the log

If you want to erase the System Administration Log, start with the display showing **Start of log**:

1. Press **ERASE**.
The display shows **Erase log?**.
2. Press **YES**.
If no new items have been added since the list was entered,
The display shows **Log is empty**.

OR

If new items have been added since the list was entered, the display shows **Log has changed**.

3. If the display shows **Log has changed**, to show the new log, press .

OR

To return to **6.Sys Admin Log**, press **EXIT**.

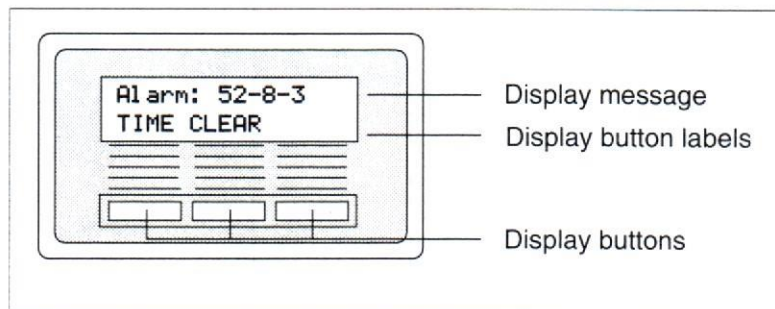
Checking when each item in the log occurred

Start with any display showing a log item:

1. Press **TIME**.
The display shows the date and time .
2. Write down the date and time on the System Administration Log record.

Alarm codes

The Norstar KSU generates alarm codes after system disconnections or after certain anomalies in system operation. All alarm codes appear at the Alarm Telephone and in the System Test Log of a Maintenance session. The following figure shows an alarm code appearing on a Norstar Alarm Telephone display.



Note: Alarms have a higher severity than events. Attend to alarm codes before event messages.

If you see an alarm code

1. Write the alarm code on the System Test Log record.
2. Determine the cause of the alarm from the following table.
3. Follow Alarm troubleshooting procedures in this chapter.
4. Press TIME to see when the alarm occurred.
5. Press CLEAR to clear the alarm.

An alarm code may not be displayed until two minutes after it has been triggered. If the KSU is powered OFF when the alarm is triggered, the alarm code is not displayed until two minutes after the KSU is powered ON.

Causes of alarm codes

Example display	Meaning	Possible causes
Alarm: 10	All KSU devices disconnected.	The last device on Norstar bus 1 (port numbers 101-124) has been removed. The 25-pair cable was disconnected from the KSU. There is an internal KSU fault.
Alarm: 11	Internal KSU failure.	The KSU is defective.
Alarm: 50-X	All devices on SM disconnected.	The last device on Norstar bus X (port numbers X01-X16) has been removed. The 25-pair cable was disconnected from the SM. The DS-30 cable from the SM to the KSU has been disconnected. The SM was powered down.
Alarm: 51-X	Trunk Module disconnected.	All Trunk Cartridges have been disconnected from the TM on DS-30 port X. The TM was powered down. The DS-30 cable from the TM to the KSU has been disconnected.
Alarm: 52-X-Y	TC disconnected from TM	Trunk Cartridge Y on DS-30 port X has been disconnected from the TM.

"X" = DS-30 port number (1-8)

"Y" = Trunk Cartridge number (numbered from left to right)

Causes of alarm codes (continued)

Example display	Meaning	Possible causes
Al arm:61-X-Y	Incompatible Trunk Cartridge	Trunk Cartridge Y on DS-30 port X cannot operate with the Trunk type assigned to it in Configuration.
Al arm:62-Y-Z	Unsupported Auto-answer setting (loop start TCs)	Trunk Cartridge Y on Trunk port Z does not support the auto-answer setting.
Al arm:63-Z	No available DTMF receivers	DTMF receivers are busy, not working properly, or have not been installed.

"X" = DS-30 port number (1-8)

"Y" = Trunk Cartridge number (numbered from left to right)

"Z" = Trunk port number

Alarm troubleshooting

Note: Refer to the previous table before following these procedures.

Alarm:10

1. Check to see if there is a device connected to the KSU (that has a port number beginning with the number "1").
2. If there are no devices connected to the KSU, connect one and then press CLEAR.
3. If there are any devices connected to the KSU, check all the wiring associated with the devices.
4. Refer to the section in the Troubleshooting chapter entitled KSU down.

Alarm:11

1. Power down the KSU and then power it up.
2. If the alarm persists, replace the KSU.

Alarm:50-X

1. Check that there is a device connected to the Station Module (that has a port number beginning with a number from three to eight).
2. If there are no devices connected to the Station Module, connect one and then press CLEAR.
3. If there are any devices connected to the Station Module, check all the wiring associated with the devices.
4. Refer to the section in the Troubleshooting chapter entitled Station Module down.

Alarm:51-X

1. Check the wiring from the KSU to the TM.
2. In the Troubleshooting chapter, follow the procedure for checking the Trunk Cartridge .
3. Refer to the section in the Troubleshooting chapter entitled Trunk Module down.

Alarm:52-X-Y

1. Follow the procedure in the Troubleshooting chapter, in the section entitled Checking the Trunk Cartridge.
2. If the problem persists, replace Trunk Cartridge Y on DS-30 port X. (Refer to the previous table for the definition of "X" and "Y").

Alarm:61-X-Y

1. Check that the proper Trunk Cartridges are inserted in the proper slots of the Trunk Module.
2. Enter Configuration programming and look under the **Trk/Line Data** heading. Check that the Trunk type and Trunk mode settings are the same for every loop start line connected to Trunk Cartridge Y.

Alarm:62-Y-Z

1. Check that the proper Trunk Cartridges are inserted in the proper slots of the Trunk Module.
2. Enter Configuration programming and look under the **Trk/Line Data** heading. Check that the Trunk mode and Answer mode settings do not conflict for every line connected to Trunk Cartridge Y. If Trunk mode is set to unsupervised, Answer mode must be set to manual.

Alarm:63-Z

1. Check that you have the required E&M/DISA Trunk Cartridges (one for every two auto-answer loop start lines).
2. Enter Configuration programming and look under the **Trk/Line Data** heading. Check that the Answer mode is correct for all the loop start lines.
3. If the problem persists, an E&M/DISA Trunk Cartridge may be malfunctioning. Replace one E&M/DISA Trunk Cartridge at a time until the problem is resolved.

Event messages

Event messages appear as items in the System Administration Log or the System Test Log of the Maintenance session. Most of these event messages can only be caused by an unusual combination of events, and should rarely occur.

Each event is assigned a severity number. An "S" preceding this number, "S4" for example, may appear in the event message. "S8" is the most severe. If the Log is full, new event messages with a higher severity number replace existing event messages of a lower severity. For this reason, you should check event messages at regular intervals. You can then deal with all messages before they are replaced.

Dealing with event messages

For every event message that you see, do the following:

1. Record the event on the appropriate Maintenance record.
2. Consult the next section entitled Significant event messages.
3. To see if the event caused the Norstar system to automatically restart, consult the subsequent section entitled Complete list of event numbers.

Significant event messages

The table on the next page lists event messages that are relevant to Maintenance activities. The time that the message is recorded is also provided.

Event message	The event message is recorded when...
Test 100 started	diagnostic test number 100 starts
Test 100 Passed	diagnostic test number 100 has been completed
Test 100 failed	diagnostic test number 100 has been completed
Evt: 220-3546 S4	the System Administration Log has been cleared by the DN (3546 in this case)
Evt: 221-3546 S4	the System Test Log has been cleared by the DN (3546 in this case)
Evt: 222-3546 S5	the DN (3546 in this case) enters the debugging facility that is password protected
Evt: 263-302 S8	the KSU takes the E&M line on port 302 out of service because the far end did not respond to a disconnect signal
Evt: 264-302 S1	the E&M line on port 302 is returned to service after the far end finally responded to a disconnect signal (see Evt: 263)
Evt: 265-302 S7	the E&M line on port 302 did not receive an expected wink signal or delay dial signal from the far end
Evt: 268-07 S8	Dialing filter 07 has lost data due to a fault in the system memory
Evt: 269-3546 S8	the Line/set filter for the DN (3546 in this case) has lost data due to a fault in the system memory
Evt: 299 S1	the system powers up after a power failure
Evt: 400 S9	a System Startup is performed using the dial pad digits
Feature * * S T A R T U P	

Significant event messages (continued)

Event message	The event message is recorded when. . .
Evt.:407 S2	there are no more codes for Speed Dial numbers
Evt.:408 S2	there is no more memory for Speed Dial codes
Evt.:412-3546 S5	the Installer password has been changed by the DN (3546 in this case)
Evt.:413-3546 S3	the Administration password has been changed by the DN (3546 in this case)
Evt.:414-3546 S5	an invalid Installer password has been entered by the DN (3546 in this case)
Evt.:415-3546 S3	an invalid customer password has been entered by the DN (3546 in this case)
Evt.:416-3546 S4	system Configuration is performed using the dial pad digits Feature * * C O N F I G
Evt.:417-3546 S2	system Administration is performed using the dial pad digits Feature * * A D M I N
Evt.:418 S7	a DN change is successful
Evt.:419 S2	the time setting has been changed
Evt.:421 S8	a DN change failed
Evt.:422-3546 S6	a length change by the DN (3546 in this case) has been requested
Evt.:423-3546 S6	an individual DN change has been requested by the DN (3546 in this case)
Evt.:822 S8	Alarm code 63 is sent because there are no DTMF receivers for an incoming call

Complete list of event numbers

You should rarely see any event messages that are not described in the section entitled Significant event messages. If you do see one of these event messages, the Norstar system has followed its normal recovery from an unusual combination of system events. Although the problem is not a serious one, repeated occurrences of the event number should be reported to the Central Support Center as soon as possible.

As a result of some events, the Norstar system automatically restarts itself. The table on the next two pages lists all the event numbers and tells you which of these events are associated with Norstar system restarts ("Y"=yes, "N"=no).

Most of these events are recorded in the System Test Log. The few exceptions to this are recorded in the System Administration Log, as indicated.

Event Number(s)	System Restart	Event Number(s)	System Restart
101-106	Y	280-283	N
107	N	285-298	Y
108-112	Y	299	N
113	N	400 (Admin log)	Y
114-116	Y	401-403	N
117	N	405-411	N
118-120	Y	412-419 (Admin log)	N
121-123	N	421-423 (Admin log)	N
124-125	Y	424-425	N
126-129	N	426-430	Y
130	Y	431	N
131-132	N	432	Y
133-134	Y	433	N
135-136	N	600-602	Y
137	Y	603-613	N
138-150	N	614	Y
151	Y	615-629	N
152	N	630	Y
160-164	N	631-646	N
170-173	N	800-802	N
200-211	N	803	Y
220 (Admin log)	N	804-807	N
221-222	N	808	Y
223 (Admin log)	Y	809	N
224	Y	810	Y
225-228	N	811-820	N
229 (Admin log)	Y	823	Y
230-235	N	824-825	N
245-248	N	900	N
250-256	N	940-943	N
260-271	N	950-989	N

Maintenance records

Maintenance records are tables on which you can record information you have obtained while running a Maintenance session.

Before you begin, photocopy the three tables in this section.

Recording information on the Maintenance records

To use the following records, do the following:

1. Write on your photocopied tables information that you obtain while running a Maintenance session.
2. Return the completed tables to your Norstar distributor.

Version number record

The Maintenance session tells you the software versions of the Real Time Processor (RTP), the System Processor (SP), and devices connected to the Norstar system. Use the following table to record these version numbers when you run a Maintenance session. You can check the RTP and SP version numbers under the heading System Version. Device version numbers are found under the heading Port/DN Status.

Version Numbers

1. System Version	2. Port/DN Status
SP:	Device:
RTP:	Device:
	Device:
	Device:
	Device:
	Device:
	Device:
	Device:
	Device:
	Device:
	Device:
	Device:
	Device:
	Device:

Note: Photocopy this page before recording items in the table.

Troubleshooting

These troubleshooting procedures allow you to solve many problems in the Norstar system. Follow these procedures before replacing any components.

WARNING

Only qualified personnel are to replace components and service hardware.

Where more than one procedure is given, the procedures represent different options from which you should select just one.

Getting ready

Before you begin troubleshooting, gather all the information that is relevant to your network configuration:

- the Norstar Programming Record,
- records from people who use the network, and
- information about other hardware and non-Norstar features within the public or private network.

Other troubleshooting tools

Remember that you can check many of the system parameters without having to go into a Configuration or Administration session.

- From an M7310 or M7324 Telephone, check line data by entering the feature code for Line profile:
 Feature * * L I N E .
- From an M7310 or M7324 Telephone, check telephone data by entering the feature code for Set profile:
 Feature * * S E T .
- To check the buttons on a particular telephone, use the feature code for Button inquiry: Feature * 0 .

Types of problems

The problems you encounter will likely fall into one of the following categories:

Misunderstanding of a feature

A problem may be reported because a Norstar user is unfamiliar with the operation of a given feature. You may be able to solve the problem simply by demonstrating how to use the feature correctly.

Programming errors

You may encounter problems caused by errors in programming. A feature may have been programmed incorrectly or may not have been programmed at all.

Wiring connections

Wiring problems are caused by loose, unconnected, or incorrectly connected wires. Use the procedures in the section on Checking the hardware as a guide.

Equipment defects

You may encounter problems caused by Norstar equipment defects. See the Problems with equipment section later in this chapter for problems related to the system hardware.

General troubleshooting procedure

1. Diagnose the trouble:
 - Ask the users for information regarding:
 - the types of problems they have experienced ,
 - how frequently the problems have occurred, and
 - how many telephones are affected.
 - Test system features and functions.
 - Use the tests described throughout this chapter.
2. Check how a feature is being used. A problem may have been reported because of a misunderstanding about how a feature works. You should confirm that the person who reported a problem understands the intended use and operation of any feature in question.
3. Check for programming errors. Check that the programming recorded in the Programming Record is correct for the intended operation of the system, and verify that this Configuration and Administration programming has been correctly entered.
4. Check wiring or hardware connections. Check the wiring and hardware connections. Refer to procedures in the next section, Installation check.
5. Run a Maintenance session. If the problem persists, run a Maintenance session as described in the Maintenance chapter of this Installer Guide.
6. Check equipment defects:
 - If hardware is shown to be defective, replace it.
 - If the trouble requires expert advice, follow your company's procedure for obtaining assistance.

Installation check

It is important to establish that both your Norstar system and your hardware are operating normally. To be sure of this, follow the procedures in this chapter.

Testing the Norstar system

Verify Norstar system functions and programming options by working through the user cards for Norstar telephones and optional equipment, as described in the following procedures.

Test the Norstar telephone operations

1. Make and receive calls.
2. Make notes on any problems.
3. Check calls that have been put on hold.

Check the programmable buttons

Use the following feature code to check what is programmed on the programmable buttons:

Button Inquiry code

Feature * 0

Test Line and Telephone programming

You can use the Line and Telephone profile inquiry features (Feature * * L I N E and Feature * * S E T) to verify the programming applied to a specific line or telephone. Refer to the Programming chapter in this Installer Guide for a description of how the Line and Telephone profile features operate.

Test the optional equipment

1. Follow the procedures in the user cards or installation documentation for the following equipment:
 - Analog Terminal Adapter (ATA)
 - Auxiliary ringer (customer-supplied)
 - Busy Lamp Field (BLF)
 - Central Answering Position (CAP) modules
 - Call Identification Interface (CII)
 - Headset (customer-supplied)
 - Music source (customer-supplied)
 - Paging (customer-supplied)
 - Station Auxiliary Power Supply (SAPS)

Test the Norstar system programming features

1. Try out some of the features such as System Speed Dial, Telephone/Line filters, and Class of Service.

Test Automatic Telephone Relocation

1. Check that Telephone Relocation is set to Y for yes in the Miscellaneous section of Configuration programming.
2. Move the telephone to another location to verify that a telephone can be re-located without re-wiring or re-programming.

Checking the hardware

WARNING

To avoid electrical shock, do the following:

1. Unplug the power to any module before servicing.
2. Do not remove the covers of a module.
3. Refer to the Installation chapter when re-installing components.

Use the following procedures (in sequence) to check apparent hardware faults.

KSU and module ac power cords

1. Check if the LED on the KSU or module (if included in the installation) is ON.
2. If the LED is OFF, check that the ac power cords for the KSU and module are plugged into the ac Power Bar.

Power Bar ac power cords

1. Check that the ac power cord from the Power Bar is plugged into a working ac outlet.

Note: Two Power Bars are required if there are four or more modules. Make sure that the power cord from the second Power Bar is plugged into the first Power Bar.

Feature Cartridge

CAUTION

Always power down before removing or inserting the Feature Cartridge.

1. Make sure that the Feature Cartridge is firmly seated in its slot.

Expansion Cartridge

CAUTION

Always power down before removing or inserting an Expansion Cartridge.

1. If the installation requires an Expansion Cartridge in the KSU, make sure it is inserted properly.

Note: If power is re-applied when the cartridge has been removed, the system programming returns to default settings.

Trunk Cartridge

CAUTION

Always power down the Trunk Module before removing or inserting a Trunk Cartridge.

1. If the installation requires a Trunk Module, make sure the Trunk Cartridge (TC) is inserted properly.

DS-30 cables

1. Make sure that both ends of the DS-30 cables (if included in the installation) are plugged into the KSU Expansion Cartridge and the module connectors.

50-pin connectors

1. Make sure that the 50-pin connectors for the external lines and for the internal wiring are plugged in and fastened securely. Refer to the chapter on Specifications and wiring charts.

25-pair wiring

1. Make sure that the wires are terminated on the distribution block and connected to the correct pins. See the chapter on Specifications and wiring charts.

Internal wiring

1. Check that the station loop resistance does not exceed $59\ \Omega$ on 0.5 mm or 24-American wire gauge.
2. If the loop length is greater than 305 m (1000 ft), ensure that the Norstar Station Auxiliary Power Supply (SAPS) is in place and functional. Follow the Norstar Station Auxiliary Power Supply Installation Card for instructions.

Cross-connections

1. Check that both ends of cross-connect wires are attached.

Problems with equipment

Before proceeding, make sure that you have followed the procedures in the Troubleshooting overview and the Installation check sections.

Norstar equipment trouble

This section concerns Norstar system equipment faults. Check first for user problems, then wiring and programming errors before replacing Norstar equipment.

Telephone dead

1. If more than one telephone is affected, refer to the section in this chapter entitled Station Module down.
2. Check for the dial tone.
3. Check the display.
4. If the problem persists, replace the telephone with a known working Norstar telephone of the same type (so that the programming is retained).
5. Check the internal wiring at both the modular jack and the distribution cross-connect.
6. Check the line cord.

Note: A TCM port should have between 15 and 20 V dc across the Tip and Ring when the telephone is disconnected.

Running a Maintenance session to test a dead telephone

1. Run a Maintenance session to ensure that the telephone is not disabled. (See Port/DN Status in the Maintenance chapter.)
2. While you are in the Maintenance session, run a connectivity test on the port connected to the telephone. This should be done after business hours to avoid losing calls.
3. Disable the port connected to the telephone using the subheading: **2.Port/DN Status**.
4. Enable the port connected to the telephone using the subheading: **2.Port/DN Status**.

KSU down

1. If ac power is present and the LED indicator on the KSU is OFF, replace the KSU. (The location of the LED indicators is described in the Installation chapter.)

Norstar telephone display unreadable**If the trouble is with an M7310 Telephone or an M7324 Telephone:**

1. Press * .
2. Press the UP or DOWN display button to adjust the display to the desired level.
3. Press the OK display button.

If the trouble is with an M7100 Telephone or M7208 Telephone:

1. Press * .
2. Press a number on the dial pad to adjust the display to the desired level.
3. Press .

If the display is still unreadable:

1. Disable the problem telephone.
2. Replace the problem telephone with a known working one.
3. Enable the working telephone.

Trunk Cartridge trouble

1. Check that the cartridge is properly inserted in the Trunk Module.
2. Run a Maintenance session to ensure that the cartridge is not disabled.
3. While you are in the Maintenance session, run a connectivity test on the appropriate ports.

If the problem persists, follow as many of the next steps as required to solve the problem:

1. If ac power is present and the LED indicator on the Trunk Module is OFF, replace the Trunk Module.
2. Replace the DS-30 cable.
Note: Refer to the Installation chapter for information on replacing components.
3. Replace the Trunk Cartridge.
4. Replace the Expansion Cartridge.
5. Replace the KSU.

Trunk Module down

1. Run a Maintenance session to ensure that the Trunk Module is not disabled. (See the Maintenance chapter.)
2. Disable the module using the Maintenance subheading **3.Module Status**.
3. Enable the module using the Maintenance subheading **3.Module Status**.
4. While you are in the Maintenance session, run a connectivity test on the appropriate ports.
5. Check the external line by terminating a single line telephone directly on the distribution block, or equivalent, which connects to the Trunk Module.

If the problem persists, follow only as many of the next steps as required to solve the problem:

1. If ac power is present and the LED indicator on the Trunk Module is OFF, replace the Trunk Module.
2. Replace the DS-30 cable.

Note: Refer to the Installation chapter for information on replacing components.

3. Replace the Trunk Cartridge.
4. Replace the Expansion Cartridge.
5. Replace the KSU.

Station Module down

1. Run a Maintenance session to ensure that the module is not disabled. (See Module Status in the Maintenance chapter.)
2. Disable the Station Module using the subheading **3.Module Status**.
3. Enable the Station Module using the subheading **3.Module Status**.
4. If the Station Module is still down, power down, then power up the KSU.

If the problem persists, follow as many of the next steps as required to solve the problem:

1. If ac power is present and the LED indicator on the Station Module is OFF, replace the Station Module.
2. Replace the DS-30 cable.

Note: Refer to the Installation chapter for information on replacing components.

3. Replace the Expansion Cartridge.
4. Replace the KSU.

Symptoms at the alarm telephone

The following troubleshooting procedures focus on alarm codes specific to network configuration.

Alarm telephone shows **Alarm: 61-X-Y**

Possible problem

You have configured one or more lines as one trunk type, but the Trunk Cartridge in slot Y of Trunk Module X is not that type.

Solution

1. Reconfigure the Trunk type to match the type of Trunk Cartridge that has been installed in slot Y of Trunk Module X.
OR
Install a Trunk Cartridge in slot Y that matches the type of Trunk you have configured.

Alarm telephone shows **Alarm: 62-Y-Z**

Possible problem

You have configured one or more loop start trunks as auto-answer, but the hardware on trunk port Z does not provide disconnect supervision.

Solution

1. Reconfigure your auto-answer loop start trunk or trunks as manual-answer.
OR
If the line number of your auto-answer loop start trunk is 009 or greater, install a loop start Trunk Cartridge with disconnect supervision in slot Y, trunk port Z.
OR
If the line number of your auto-answer loop start trunk is between 001 and 008, install a Version 2 or higher KSU.

Alarm telephone shows Alarm: 63-Z

Possible problem

The trunk of port Z has tried, unsuccessfully, to access a DTMF receiver. You have configured more auto-answer loop start trunks than you have DTMF receivers.

Solution

1. Increase your ratio of E&M/DISA Trunk Cartridges to loop start trunks. The maximum is one E&M/DISA Trunk Cartridge for every two loop start trunks that you have configured as auto-answer.
2. Make sure that all of your E&M/DISA trunks are configured as E&M or DTMF (whichever applies) so that the system knows the receivers are there.

Possible problem

The DTMF receivers are not working properly.

Solution

1. Check the DTMF receivers on every E&M/DISA Trunk Cartridge.

Problems with lines

The troubleshooting problems listed here focus on trouble with making calls or using lines. Follow the procedures in the Troubleshooting overview and the Installation check sections before proceeding with this section.

Calls cannot be made (but can be received)

1. Press * 0 .

2. Press a line button.

3. If an incorrect line number or name appears (or if neither appears) on the Norstar telephone display, check the Configuration settings.

OR

If the correct line number or name appears on the Norstar telephone display, make sure the external lines are properly cross-connected.

4. If Trunk Modules or Trunk Cartridges are installed, refer to Trunk Cartridges and Trunk Module down, in the section on Problems with equipment (earlier in this chapter).
5. Check external lines by attaching a test telephone directly on the distribution block, which connects to the Trunk Module.
6. Ensure that the 25-pair cable is properly connected to the modules or the KSU.
7. If you still cannot make an external call, perform a Maintenance session to check the external line.

Running a Maintenance session to check the external line

1. Run a Maintenance session to ensure that the line (and the Trunk Cartridge) is not disabled or unequipped. (See Port/DN Status in the Maintenance chapter.)
2. Disable the appropriate ports using the subheading **2.Port/DN Status**.

Note: For charts showing external line port number defaults, refer to the chapter on Specifications and wiring charts.

3. Enable the appropriate ports using the subheading **2.Port/DN Status**.
4. If you still cannot make external calls, power down, then power up the KSU. This should be done after business hours to avoid losing calls.

Note: To check the line, contact the telephone company.

Dial tone absent (on external lines)

1. Use Button Inquiry, * 0 , to display the number of the external line you are testing.
2. Check for a dial tone by using a test telephone at the connections for the external line on the distribution block.
3. If applicable, make sure that a Trunk Cartridge for the line is properly installed in the Trunk Module.
4. Make sure that the Trunk Module DS-30 cable is properly connected to the Expansion Cartridge on the KSU.
5. Refer to the sections Trunk Cartridges and Trunk Module down, in this chapter.
6. Run a Maintenance session to ensure that the line is not disabled. (See Port/DN Status in the Maintenance chapter.)
7. While you are in the Maintenance session, run a connectivity test on the external line that has no dial tone. This should be done after business hours to avoid losing calls.

Hung lines at a telephone

Line indicators that have been solid for a long time are the only visible indication that lines are hung.

A line that has been redirected using Line Redirection may, under some circumstances, remain busy after a call is over. If this happens, the outgoing line for the redirection also remains busy. You can clear this kind of hung line only at the telephone that was used to redirect the line.

1. Select Button Inquiry (* 0) at the telephone that was used to redirect the line.
2. Press the button of the redirected line.
3. Press SHOW or .
4. Press DROP or .

Both the redirected line and the outgoing line for the redirection should now be cleared.

For lines that are hung for any other reason you will have to run a Maintenance session.

1. Run a Maintenance session and go to the subheading **2.Port/DN Status**.
2. If the hung line is on the KSU, disable and enable Module 2.
OR
If the hung line is on a Trunk Cartridge, disable and enable only that Trunk Cartridge.

Follow the procedures in the Troubleshooting overview and the Installation check sections before proceeding.

Auto-answer line rings at a Norstar telephone

Possible problem

You configured a loop start trunk as auto-answer but the installed hardware does not support disconnect supervision. (In this case, the symptom would be accompanied by the Alarm 62 code symptom.)

Solution

1. Reconfigure the trunk as manual-answer.

OR

If the line number of your auto-answer loop start trunk is 009 or greater, install a loop start Trunk Cartridge with disconnect supervision in slot Y, trunk port Z.

OR

If the line number of your auto-answer loop start trunk is between 001 and 008, install a Version 2 or higher KSU.

Possible problem

You configured the line as auto-answer and supervised, and then reconfigured the line as unsupervised.

Solution

1. Reconfigure the line as manual-answer.

OR

Reconfigure the line as supervised.

Prime telephone gets misdialed calls

Possible problem

The digits sent by a switch at a Central Office or in the private network did not match any Received number, the Auto DN, or the DISA DN. The call has been routed to the Prime telephone for the incoming trunk.

Solution

1. Verify that the switch is sending the correct number of digits for the Received number length defined in your system.
2. Verify all the digit strings that the switch should be sending.
3. Check that you have defined the corresponding Received number for every target line in your system.
4. Make sure that the published telephone numbers for your network are correct.

Selected line shows Not in service**Possible problem**

You have configured a DTMF line to appear at the telephone.

Solution

1. Reconfigure the line so that it does not appear at any telephone and configure another line to replace it at the telephone.

OR

Reconfigure the line as a different type and install trunk hardware to support the new type of line.

Possible problem

The Norstar system has taken an E&M line out of service because the far end did not respond to a disconnect signal from the Norstar system. The symptom would be accompanied by Event code 263 in the System Test Log.

Solution

1. Check with the operators of the system at the far end and find out if their system is operating.
2. Check that your system hardware is receiving signals properly.
3. Check the trunk between your system and the far end system for a break.

Possible problem

The Norstar system has detected no response on an E&M line from the system at the far end. The symptom will be accompanied by Event code 265 in the System Test Log.

Solution

1. Check with the operators of the system at the far end and get them to troubleshoot their system.

Possible problem

The line has been disabled for maintenance purposes.

Solution

1. Enable the line.

OR

If the line will be out of service for some time, configure another line to replace it on the telephone.

Selected line pool shows No free lines

Possible problem

If this happens often, there are not enough lines in the line pool to serve the number of line pool users.

Solution

1. If the line pool contains loop start trunks, enter Configuration and move under-used loop start trunks from other line pools into the deficient line pool.

OR

If the line pool contains E&M trunks, order more trunks from the telephone company or private network vendor. Install additional Trunk Cartridges of the appropriate type. In Configuration programming, add the new trunks to the deficient line pool.

Problems with features

In general, when you try to use a Norstar feature and it does not work, test your lines first to ensure that other feature codes are working.

Follow the procedures in the Troubleshooting overview and the Installation check sections before proceeding.

Problem descriptions

The following is a list of common feature problems that may occur in a Norstar system.

Autodial button cannot be programmed

1. Refer to the Telephone features chapter.
2. If the display shows **Autodial full**, there is no memory left for Autodial buttons.
3. If the display shows **Access denied**, someone may be programming changes. Wait five minutes, then try again to program the buttons.
4. Run a Maintenance session and look at the events shown under **5.Sys Test Log**.

Remote feature code gets no response

Possible problem

A Norstar user has called into another Norstar system and is trying to activate a remote feature but gets no response after dialing the feature code. The Norstar user may have pressed the Feature button to activate the remote feature.

Solution

1. Make sure that remote callers are dialing the feature code correctly. Only the asterisk (*) character, followed by the feature code, can activate a remote feature.

Dialed number shows Restricted call

Possible problem

If this happens often, the Norstar telephone or user has an inappropriate set of dialing restrictions.

Solution

1. In Administration programming, check the Set filter and the Line/set filter for the telephone. Assign restrictions and exceptions that will permit access to the required destinations.

OR

Give the Norstar user a Line Pool access code to a line pool that permits access to the required destinations.

OR

If this happens to a number of people who share a line, check the Line filter. Assign restrictions and exceptions that will permit access to the required destinations.

OR

If the caller used the changed Class of Service, check the User filter for the Class of Service. Make sure that the restrictions and exceptions are appropriate for the user.

Music on Hold/Background Music trouble

Although Music on Hold and Background Music are separate features, they share the same wiring and customer-supplied music source.

1. Ensure that the proper feature access code
 is turned ON. Adjust the volume using the volume control bar.
2. Use the Button Inquiry feature
 * to verify the feature on a programmable memory button.
3. If there is trouble with Music on Hold, check Call Handling in Configuration.
OR
If there is trouble with Background Music, check Miscellaneous in Configuration.
4. Check the wiring between the music source and the 50-pin connector. Pay special attention to the polarity of the connections. See the wiring charts in the Technical data chapter.
5. Ensure that the music source is turned ON, is operational, and the volume control is set properly.

Note: Any music source with a low-output impedance (for example, less than 3,300 ohms) can be connected. Nominal output level should be less than one volt.

Personal Speed Dial cannot be programmed

1. See the troubleshooting procedure for Autodial buttons cannot be programmed, described earlier in this section.

Network telephone trouble for remote users

Symptoms described in this section are those that appear to a remote caller attempting to use Norstar system resources. The remote caller may be calling from the public network or the private network.

Follow the procedures in the Troubleshooting overview and the Installation check sections before proceeding.

Calling directly to Norstar

The following troubleshooting procedures focus on a remote caller trying to reach a Norstar telephone or device.

Dialed number gets ringback and the wrong person

Possible problem

The digits sent by a switch at a Central Office or in the private network did not match any Received number, the Auto DN, or the DISA DN. The call has been routed to the Prime telephone for the incoming trunk.

Solution

1. Verify that the switch is sending the correct number of digits for the Received number length defined in your system.
2. Verify all the digit strings that the switch should be sending.
3. Check that you have defined the corresponding Received number for every target line in your system.
4. Make sure that the published telephone numbers for your network are correct.

Dialed number gets stuttered dial tone instead of ringback**Possible problem**

The remote caller has tried to reach a Norstar target line, but has reached a trunk with DISA instead. Alternatively, the Norstar system has mapped incoming digits onto the DISA DN.

Solution

1. Verify all the digit strings that the switch should be sending.
2. Check that you have defined a corresponding Received number for every target line in your system.
3. Check that you have defined the correct DISA DN for your system.
4. Make sure that the published telephone numbers for your network are correct.

Dialed number gets dial tone instead of ringback**Possible problem**

The remote caller has tried to reach a Norstar target line, but has reached the Norstar system instead. Norstar has mapped the incoming digits onto the Auto DN.

Solution

1. Verify all the digit strings that the switch should be sending.
2. Check that you have defined the corresponding Received number for every target line in your system.
3. Check that you have defined the correct Auto DN for your system.
4. Make sure that the published telephone numbers for your network are correct.

Dialed number gets busy tone**Possible problem**

The target line that the incoming digits map onto is busy, and there is no Prime telephone for the incoming trunk.

Solution

1. For maximum call coverage, make sure that you configure a Prime telephone for every incoming trunk.

Dialed number does not get through

Possible problem

The digits sent by a switch at a Central Office or in the private network did not match any Received number, the Auto DN, or the DISA DN. There is also no Prime telephone assigned for the incoming trunk. In this case, the caller may hear overflow tone from the Norstar system or a recorded message from the originating switch.

Solution

1. Configure a Prime telephone for every incoming trunk.
2. Verify that the switch is sending the correct number of digits for the Received number length defined in your system.
3. Verify all the digit strings that the switch should be sending.
4. Check that you have defined a Received number for every target line in your system.
5. Make sure that the published telephone numbers for your network are correct.

Possible problem

The Norstar system did not receive some or all of the incoming digits.

Solution

1. Check that the system hardware is receiving signals properly.
2. Verify that the switch is sending the correct number of digits for the Received number length defined in your system.
3. If the switch at the far end is sending pulse signals, make sure they are being sent at the proper rate. (Pulse digits must be 300 ms or more apart for Norstar to receive them.)

Possible problem

If remote callers are having difficulty getting through from the public network, there may be a problem with your DID TC.

Solution

1. Connect a single-line telephone with DTMF tones to a DID trunk input on the DID TC.
2. Use the single-line telephone to enter a Received number that has been programmed for a target line in your system. Listen for ringback.
3. If you do not hear ringback, check that the target line is assigned to a telephone and that there is a Prime telephone assigned for the DID trunk.
4. If you now hear ringback, but you also hear the noise of your unanswered call ringing, check the cross-connections. If all the cross-connections are correct replace the Trunk Cartridge.

Possible problem

If remote callers are having difficulty getting through from the private network, there may be a problem with your E&M TC.

Solution

1. Check the cross-connections for the E&M/DISA TC.
2. If the E&M trunks are connected to another Norstar system, make sure that connections have been made as indicated in the Technical data chapter in this Installer Guide.
3. Use the following table to check for correct voltage on the E&M/DISA leads:

Voltages on E&M leads

Leads	Voltage: active	Voltage: inactive
V _{T-R}	125 mV ac on steady dial tone	0 V ac
V _{T1-R1}	125 mV ac on steady dial tone	0 V ac
V _{E-SG}	0 V dc to -5 V dc	-48 V dc
V _{M-SB}	0 V dc to +2 V dc	-48 V dc

Calling Norstar through DISA

A remote caller expects to hear two different kinds of tones when calling a DISA number. A stuttered dial tone indicates that the system is ready for a COS password. Once the password is entered, the dial tone is presented.

Dialed number gets ringback instead of stuttered dial tone

Possible problem

The remote caller has dialed a DISA number, but has instead reached a target line, or has been routed to the Prime telephone for the auto-answer trunk. The Norstar system has mapped the incoming digits from a switch onto a target line, or has been unable to map the digits anywhere.

Solution

1. Verify that the switch is sending the correct number of digits for the Received number length defined in your system.
2. Verify all the digit strings that the switch should be sending.
3. Check that you have defined the correct DISA DN for your system.
4. Make sure that the published telephone numbers for your network are correct.

Dialed number gets dial tone instead of stuttered dial tone

Possible problem

The remote caller has dialed a DISA number, but has reached the Norstar system instead. The Norstar system has mapped the incoming digits from a switch onto the Auto DN.

Solution

1. Verify that the switch is sending the correct number of digits for the Received number length defined in your system.
2. Verify all the digit strings that the switch should be sending.
3. Check that you have defined the correct DISA DN for your system.
4. Make sure that the DISA DN and Auto DN are different enough to prevent misdialing.
5. Make sure that the published telephone numbers for your network are correct.

COS password gets overflow tone

Possible problem

The remote caller may have entered an invalid password.

Solution

1. Check the Administration programming under COS passwords and verify that the caller has a valid password.

Note: Make sure that all users are informed of password changes.

Possible problem

The remote caller may have entered an asterisk (*) as one of the 6 digits.

Solution

1. Instruct remote callers to enter their COS password correctly: enter 6 digits that are numeric characters.

Possible problem

The remote caller may have entered a number sign (#) as one of the 6 digits.

Solution

1. Instruct remote callers to enter their COS password correctly: enter 6 digits that are numeric characters. The number sign (#) may be entered after the 6th digit, but is not required.

Possible problem

The remote caller may have waited more than 15 seconds between entering digits.

Solution

1. Instruct remote callers to enter their COS password correctly: enter 6 digits that are numeric characters. and do not pause too long between digits

Possible problem

The caller may be dialing from a rotary-dial telephone or from a push-button telephone that has the dial-mode set to "pulse".

Solution

1. Inform remote callers that they must dial from a push-button telephone that has the dial-mode set to "tone".

Using Norstar remote features

The following troubleshooting procedures focus on a remote caller who has received dial tone for the Norstar system but then encounters a problem when trying to enter the remote feature code.

Dialed feature code gets overflow tone

Possible problem

The remote caller does not have access to that feature.

Solution

1. If the call came in on a trunk with DISA, check the Class of Service that is associated with the remote caller's COS password. If it is too restrictive, assign another COS password that is more suitable.
2. If the call came in on a trunk without DISA, check the Class of Service that you assigned to the incoming trunk. Make sure that it gives the appropriate access to the remote caller.

Possible problem

The feature code is not valid.

Solution

1. Make sure that remote callers have a correct listing of the features that are programmed for remote access.
2. Ensure that remote callers are dialing the feature code correctly. Press *****, followed by the feature code to activate a remote feature.

Possible problem

The caller may be dialing on a rotary-dial telephone or on a push-button telephone that has the dial-mode set to "pulse".

Solution

1. Inform remote callers that they must dial from a push-button telephone that has the dial-mode set to "tone".

Dialed feature code gets busy tone

Possible problem

A resource that the remote feature uses may currently be in use. For example, a remote caller trying to use the paging feature would get a busy tone if the auxiliary speaker were being used at the time.

Solution

1. If repeated attempts to use the remote feature get busy tone, there may be a malfunction in a resource that the feature uses. Check that the remote feature hardware is functioning normally.

Calling through Norstar to another system

The following troubleshooting procedures focus on a remote caller trying to use your Norstar trunks to reach another system.

Line Pool access code gets overflow tone

Possible problem

If the published Line Pool access code is valid, the remote caller does not have access to that line pool.

Solution

1. If the incoming trunk answers with DISA, give the remote caller a COS password that permits access to that line pool.
OR
change the Class of Service for the incoming trunk so that it permits access to that line pool.
OR
give the remote caller a Line Pool access code that is permitted within the Class of Service on the incoming trunk.

Possible problem

If the published Line Pool access code is invalid, the system has attempted, without success, to match the invalid code to a Norstar target line DN, and there is no Prime telephone for the auto-answer trunk.

Solution

1. Make sure that the published Line Pool access codes are correct.
2. Check that the Line Pool access codes have been entered correctly under **4. Miscellaneous** in Configuration programming.

Possible problem

The caller may be dialing from the network on a rotary-dial telephone or on a push-button telephone that has the dial-mode set to "pulse".

Solution

1. Inform remote callers in the public network that they must dial from a push-button telephone that has the dial-mode set to "tone".

Line Pool access code gets ringback**Possible problem**

The published Line Pool access code is invalid, and the system has routed the call to the Prime telephone for the incoming trunk.

Solution

1. Make sure that the published Line Pool access codes are correct.
2. Check that the Line Pool codes have been entered correctly under **4. Miscellaneous** in Configuration programming.

Line pool access code gets busy tone

Possible problem

There are not enough lines in the line pool to serve the number of users.

Solution

1. If the line pool contains loop start trunks, enter Configuration and move under-used loop start trunks from other line pools into the deficient line pool.

OR

If the line pool contains E&M trunks, order more trunks from the telephone company or private network vendor. Install additional E&M Trunk Cartridges. In Configuration programming, add the new trunks to the deficient line pool.

OR

Create a separate line pool for remote users only.

Possible problem

There are DID lines in the line pool.

Solution

1. In Configuration programming, make sure that there are no DID lines in any of the line pools.

Dialed number gets no response

Possible problem

The remote caller, after accessing a line in a line pool, may have started dialing before the far end was ready to receive digits.

Solution

1. Instruct remote callers to wait until they hear feedback before entering any digits.

Possible problem

There may be a malfunction in the line that the remote caller accessed.

Solution

1. If the problem is persistent, check that all lines in the affected line pool are functioning normally.

Possible problem

There may be a malfunction in the system that the caller is trying to reach.

Solution

1. Inform the operators of the system at the far end that the dialed number is not getting through.

Problems with optional equipment

Analog Terminal Adapter (ATA)

1. Check the single line telephone by using a known working test Norstar telephone.
2. Check the connections to the jack.
3. Check the connections to the ATA.
4. Disconnect the ATA and replace it with a working Norstar telephone. If the telephone still works properly, the KSU and/or the SM are operating properly.
5. Verify that the programming has been done as described in the *Norstar Modular DR5 Programming Record* and the *Norstar Analog Terminal Adapter Installation Card*.
6. If the trouble seems to be in the KSU or SM, double-check all wiring and programming options. If this does not help, refer to the sections on KSU down or Station Module down.

OR

If the trouble seems to be with the ATA, disable the ATA and replace it with a known working one.

Running a Maintenance session to test an ATA

1. Run a Maintenance session to ensure that the ATA is not disabled. (See Port/DN Status in the Maintenance chapter.)
2. While you are in the Maintenance session, run a connectivity test on the port connected to the telephone. This should be done after business hours to avoid losing calls.
3. Disable the port connected to the ATA using the subheading:
2.Port/DN Status.
4. Enable the port connected to the ATA using the subheading:
2.Port/DN Status.

Auxiliary ringer

1. If the auxiliary ringer is used for Service Modes (Night, Evening, or Lunch service), ensure that Service Modes is activated from the Control Telephone.
2. Check the wiring between the auxiliary ringer generator and the ringing device. Refer to the auxiliary ringer wiring chart.
3. Check the wiring between the auxiliary ringer generator and the distribution block:

Auxiliary ringer wiring

Feature	Pin
Auxiliary ring (Make)	43 (Yellow-Green)
Auxiliary ring (Common)	18 (Green-Yellow)

4. Ensure that the auxiliary ringer contacts are operating properly by checking for contact operation with an ohmmeter across the auxiliary ringer pin contacts listed above.
5. Check that the auxiliary ringer pin contacts are programmed to operate in conjunction with any or all of the features in the auxiliary ringer programming chart.

Auxiliary ringer programming

Feature	Programmed in	
Auxiliary ringer: Lines	Configuration:	Line Data
Auxiliary ringer: Sets	Administration:	Telephone abilities
Service Modes (Night, Evening, Lunch)	Administration:	Service Modes

Note: The current capacity of the Norstar relay contacts is 50 mA dc. They are designed to operate with the auxiliary ringer generator, or equivalent.

Call Identification Interface

1. Use the Call Information feature on an incoming call to verify the operation of the CII.
2. Check the connections to the CII. Refer to the *CII Installer Card* for installation details.
3. Verify that the programming has been done as described in the *Norstar Modular DR5 Programming Record* and the *Norstar Modular DR5 System Coordinator Guide*.
4. Run a Maintenance session to test the CII.
5. Verify that you are subscribing to visual Call Display services from your local telephone company.
6. Replace the CII

Running a Maintenance session to test a CII

1. Run a Maintenance session to ensure that the CII is not disabled. (See Port/DN Status in the Maintenance chapter.)
2. While you are in the Maintenance session, run a connectivity test on the port connected to the CII.
3. Disable the port connected to the CII using the subheading:
2.Port/DN Status.
4. Enable the port connected to the CII using the subheading:
2.Port/DN Status.

External paging

1. Use the Button Inquiry feature * to verify the feature of a programmable memory button.
2. Check the wiring between the 50-pin connector and the paging amplifier or between the connections shown in the external paging wiring chart.

External paging wiring

Feature	Pin
Page out (Tip)	47 (Violet-Orange)
Page out (Ring)	22 (Orange-Violet)

3. Test external paging 6 to ensure that it is working. The output signal from the Norstar KSU is 775 mV across 600 Ω .

Glossary

A

Access code: A sequence of characters used to gain entry into any type of Norstar system programming.

Administration: A program that lets one person in your office (the System Coordinator) assign and maintain certain settings on the Norstar system.

Administration access code: To access Administration programming, enter

Feature * * A D M I N

You will be asked for an Administration password.

Administration password: A one-to six-digit password which is used to prevent unauthorized access to Administration programming. The Administration password can be assigned and changed in Administration programming.

Alarm code: A number which appears on the Alarm Telephone's display, informing you that the KSU has detected a fault in the system.

Alarm Set (Alarm Telephone):

A telephone which is designated to receive reports of Norstar system problems. This function is usually assigned to a Prime Telephone, but this can be changed in Configuration programming.

Allow Redirect: A sub-heading in Administration programming that allows you to set whether Line Redirection can be used from that telephone.

Alternate language:

When your system is first installed, all telephone displays will be in English. Norstar systems are available with either French or Spanish as the alternate language. To select the alternate language, enter

Feature * 5 0 2

To re-select English, enter

Feature * 5 0 1

Analog Terminal Adapter

(ATA): A device which permits the connection of analog telecommunication devices such as FAX machines, answering machines, and single line telephones to the Norstar system. Programmed defaults for the ATA are automatically assigned by the Norstar system.

Answer button: A telephone button with an indicator which is used to monitor another telephone. The Answer button indicates incoming calls destined for the other telephone. Someone working at a telephone with Answer buttons (a receptionist, for example) can receive all ringing and visual indication of incoming calls for other telephones, and answer those calls when necessary.

One telephone can have up to four Answer buttons. An Answer button is automatically assigned to a telephone when that telephone is assigned an Answer DN.

Answer DN: The Directory Number (DN) of a telephone that is monitored by an Answer button. Up to four Answer DNs can be assigned to a telephone. This is done in Configuration programming.

Autobumping:

Feature 8 1 5

A feature that determines what the system does with new Call Log items when your Call Log is full. When Autobumping is ON, a new log entry causes the oldest entry to be deleted. If Autobumping is OFF, your Norstar system does not log calls when your log is full.

Autodial button: A memory button which, if programmed, provides one-touch dialing of external or internal numbers.

Autolog options:

Feature * 8 4

A feature that allows you to select the type of calls that are stored in your Call Log. You can choose to log calls that were not answered by anyone within the system, to log calls that were unanswered at this telephone but answered elsewhere in the system, to log all calls answered and not answered at this telephone, or to not have calls automatically logged.

Automatic Dial: A feature that allows you to dial without having to pick up the receiver or select a line. You must have a prime line to use Automatic Dial.

Automatic Handsfree: A feature which automatically activates Handsfree operation when you make or answer a call. Automatic Handsfree is assigned in Administration programming.

Automatic Hold: A feature which automatically places an active call on hold when you select another line. Automatic Hold is programmed in Configuration programming.

Automatic Privacy: See Privacy.

Automatic Telephone

Relocation: A feature which lets a telephone retain its personal and system programming when it is plugged into a different Norstar modular jack. Automatic telephone relocation is enabled in Configuration programming.

Auxiliary ringer: A separate external telephone ringer or bell which can be programmed to ring when a line or a telephone rings. An auxiliary ringer may be programmed to ring only when the system is in a particular service mode. Programming of an auxiliary ringer is done in Administration programming after the feature has been enabled in Configuration programming.

B

Background Music: A feature which lets you hear music from the speaker of your Norstar telephone. It is available only if a music source has been attached to the KSU and the feature has been enabled in Configuration programming.

Busy Lamp Field (BLF): A device with a liquid crystal display (LCD) panel of indicators that shows the status of up to 24 telephones in the Norstar system. The BLF will show a telephone as busy if it is active on a call, has Do Not Disturb turned ON, or is being used for programming. The BLF attaches to the M7310 Telephone.

Button caps: Interchangeable plastic caps which fit over the buttons of Norstar telephones. They are used to indicate the features programmed onto each programmable memory button. Button caps are either pre-printed or have clear windows which allow you to insert labels.

Button Inquiry:

Feature *

With this feature you can check the function of each programmable button on your Norstar telephone.

Bypass Restrictions:

Overrides any Call Restrictions applied to specific System Speed Dial numbers. Bypass Restrictions can be turned on in Administration programming.

C

Call Duration timer:

Feature 7

A feature that lets you see how long you spent on your last call or how long you have been on your present call.

Call Forward:

Feature 4

A feature that forwards all the calls arriving at your telephone, to another telephone in your Norstar system. To have calls forwarded outside the system, use Line Redirection. To cancel Call Forward, enter

Feature # .

Call Forward No Answer: A feature which forwards all calls arriving at your telephone to another designated telephone in your Norstar system after a specific number of rings. Call Forward No Answer is assigned in Administration programming.

Call Forward On Busy:

A feature which forwards all calls at your telephone to another designated telephone if your telephone is busy. This feature is assigned in Administration programming.

Call Forward Override:

Call Forward Override lets you call someone and ask them to stop forwarding their calls to you.

Call Information:Feature 8 1 1

Call Information allows you to display information about incoming calls. For external calls, you can display the caller's name, telephone number and the line name. For an internal call, you can display the name of the caller and their internal number. You can obtain information about ringing, answered, or held calls.

Call Log: A feature that accesses a record of incoming calls. The log could contain the following information for each call: sequence number in the Call Log, name and number of caller, long distance indication, indication if the call was answered, time and date of the call, number of repeated calls from the same source, and name of the line that the call came in on. See Autobumping, Autolog options, Enter Call Log, and Logit for further information.

Call Park:Feature 7 4

With this feature you can place a call on hold so that someone can retrieve it from any other telephone in the Norstar system by selecting an internal line and entering a retrieval code. The retrieval code appears on the display of your telephone when you park the call. You can park up to nine calls on the system at one time.

Call Park Callback: See Callback.

Call Park prefix: The first digit of the retrieval code of a parked call. This digit cannot conflict with the first digit of any existing DNs, Line Pool access codes, the Direct-dial digit, or the external line access code. The default Call Park prefix digit is "1". It may be set to none, in which case Call Park is disabled. Call Park prefix is assigned in Configuration programming.

Call Pickup Directed:Feature 7 6

A feature which lets you answer a call ringing at any Norstar telephone by entering the internal number of that telephone before taking the call. Call Pickup Directed is enabled in Configuration programming.

Call Pickup Group: See Pickup Group.

Call Queuing:Feature 8 0 1

If you have several calls waiting at your telephone, you can invoke the Call Queuing feature to answer them in order of priority. Priority is given to incoming calls, followed by callback and camped calls.

Callback: If you park, camp, or transfer a call to another telephone and it is not answered there, it will ring again at your telephone. How long the system will wait before Callback occurs is set in Configuration programming.

Camp-On:Feature

A feature which lets you re-route a call to a telephone even if all the lines on that telephone are busy. To answer a camped call, use Call Queuing or select a line if the camped call appears on your telephone. Priority is given to queued calls over camped calls.

Camp timeout: The length of a delay before a camped call is returned to the telephone which camped the call. The length of delay is set in Configuration programming.

Capabilities: A section in Administration programming, that covers dialing filters, remote access packages, set abilities, and line abilities which can be assigned to Norstar lines, telephones, or Class of Service passwords.

Central Answering

Position(CAP): An M7324 Telephone which has been designated a CAP in Configuration programming. The CAP provides backup answering and can be used to monitor the telephones within a Norstar system. One or two CAP modules can be attached to a CAP to increase the number of lines it can handle.

Central Answering Position

(CAP) module: A CAP module is connected to an M7324 Telephone and provides 48 additional buttons which can be used as Autodial buttons or Feature buttons. A maximum of two CAP modules can be connected to a single M7324 Telephone.

Class of Service (COS):

The set of Norstar features and lines available to the user for a call. The Class of Service for a call is determined by the Dialing Filters and Remote Access Packages assigned to the telephone in Administration programming. Class of Service for a call can be changed by entering a six digit Class of Service password. (Internal users cannot change their access to features with a COS password, only their dialing filters.) Class of Service and Class of Service passwords are assigned in Administration programming. See Remote Access.

Class of Service password:Feature

A Class of Service password is a six digit code that lets you switch from your current Class of Service to one that lets you dial numbers prohibited by your current Class of Service.

Conference:Feature

The Conference feature allows you to establish a three-person call at your Norstar telephone.

Conference using privacy:Feature

Normally your calls are private; no one else can pick up your line and join in. You can turn privacy off for a call, allowing another person with the same line to press the line button and join in your conversation.

Contrast Adjustment:Feature

Allows you to set the contrast level of your telephone display.

Control Telephone: A Control Telephone can place the lines for which it has responsibility in or out of a Service Mode. The Direct-dial Telephone is a Control Telephone for directing calls to the Extra Direct-dial Telephone. A telephone is made a Control telephone and has lines assigned to it in Administration programming.

COS: See Class of Service.

Cursor: A short horizontal line which appears on the Norstar telephone display to indicate that characters can be entered using the dial pad.

D**Data Communications**

Interface (DCI): A Norstar device which lets you attach an RS-232 data device to the Norstar system.

Data terminal: A device such as a modem which can be used to transfer data instead of sound over a telephone network. You cannot use Norstar programming to set up such devices. See the documentation that accompanies the device.

Date: See Show Time or Time and Date.

Defaults: The settings for all Norstar features when the system is first installed. Settings are changed from their defaults in Administration programming and Configuration programming. In this manual, default settings are shown in **bold** text.

Delayed Ring Transfer (DRT) to Prime: After a specified number of rings, this feature transfers an unanswered call on an external line, to the Prime Telephone associated with that line. This feature is activated in Configuration programming.

Dialing filter: Through a combination of restrictions and exceptions, dialing filters prevent certain telephone numbers from being dialed. Dialing filters can be applied to lines (line filters, remote filters), to sets (set filters), to specific lines on a set (line/set filters), and to Class of Service passwords (user filters, remote filters). The Norstar system can handle up to 100 dialing filters.

Dialing Modes:Feature * 8 2

This feature allows you to set the dialing mode of your telephone. Norstar supports three dialing modes; Automatic Dial, Pre-Dial, and Standard Dial. All three modes support on-hook dialing (meaning you can dial a call without picking up the receiver). The special features of the Automatic and Pre-Dial modes are available only when you dial on-hook.

Direct-dial: A feature which lets you dial a designated telephone in your Norstar system with a single digit. As many as five direct dial sets can be established. Each telephone in the system is assigned to one Direct-dial telephone. There is a single, system wide digit for calling the assigned Direct-dial telephone of any telephone. Direct-dial telephones are established in Administration programming. Telephones are assigned to a Direct-dial telephone in Administration programming.

Direct-dial #: A digit used system wide to call a direct dial telephone. The digit is assigned in Configuration programming.

Direct-dial number: The digit used to call the Direct-dial telephone.

Direct Inward System Access (DISA):

The feature which lets remote users dial directly into the Norstar system and use Norstar features. Callers will hear stuttered dial tone and will be required to enter a Class of Service password to gain access to the system. See Remote Access.

Directed Pickup: See Call Pickup Directed.

Directory Number(DN): A unique number which is automatically assigned to each telephone or data terminal. The DN, also referred to as an internal number, is often used to identify a telephone when settings are assigned during programming. Default DN assignments start at 21 in a two-digit (non-expanded) system and 221 in a three-digit (expanded) system.

DISA DN: The received number assigned to the Norstar Direct Inward System Access facility. If a caller dials a number which is assigned to the DISA DN, the caller hears stuttered dial tone and must enter a Class of Service Password. Once the password is accepted, the caller hears system dial tone and can use Remote Access features. See Remote Access.

Disconnect Supervision: A setting which enables the Norstar system to detect if an external caller hangs up. Once an external caller hangs up, the Norstar system can disconnect its line. Disconnect Supervision is enabled in Configuration programming.

Display: A liquid crystal display (LCD) on the Norstar telephone that guides you through feature operation and programming.

Display button: The Norstar M7310 Telephone and M7324 Telephone are each equipped with three buttons located directly beneath the display. During feature operation or programming, some or all of these buttons may be used to provide further options. If an option is available, it is shown in the bottom row of the two row display, directly above the corresponding display button. Display buttons are represented in this manual as underlined capital, e.g. OK.

Display digits: In Administration programming, this subheading lets you set whether an assigned name or the actual number will be displayed when someone uses a system speed dial code.

DN: See Directory Number.

Do Not Disturb:

Feature

A feature that stops calls from ringing at your telephone. Only Priority Calls will ring at your telephone. A line button will flash when you receive a call, but the call will not ring. To cancel Do Not Disturb, enter

Feature .

DRT delay: The number of rings before a Delayed Ring Transfer occurs. This is assigned in Configuration programming.

DRT to Prime: See Delayed Ring Transfer to Prime.

E

Emergency Telephone: A single line telephone (also referred to as a 500/2500 telephone) that becomes active when there is no power to the Key Service Unit.

Enter Call Log:

Feature

Enter your Call Log to view stored information.

Event message: Event messages are stored in the system log and displayed during a Maintenance session. They record a variety of events and activities in the Norstar system.

Exceptions: One component of a Dialing filter. Exceptions are numbers you can dial even if they are forbidden by a more general Restriction. See Restrictions.

External call: A call to a destination outside the Norstar system.

External Call Forward: See Line Redirection.

External code: The number you dial to get an external line. By default it is 9, but this can be changed in Configuration programming. You do not always need an external code. It is primarily to support the M7100 Telephone and single line telephones using an Analog Terminal Adapter.

External line: A line on your Norstar telephone used for making calls to destinations outside the Norstar system.

External music source: See Music source.

External paging: A feature you can use to make voice announcements over an externally-mounted loudspeaker connected to the Key Service Unit. The external speaker is not a Norstar component and must be supplied by the customer.

Extra-Dial set: In Administration programming, this heading lets you assign an extra Direct-dial set when a service mode is active. You can have one Extra-Dial set for each of the three service modes.

F

Feature button: Many Norstar features are invoked by pressing the Feature button followed by a Feature code. The feature button is also used to exit a feature.

Feature Cartridge: A replaceable cartridge containing the Norstar features. The Feature Cartridge, a combination of a Data Cartridge and a Software Cartridge, is inserted into the Key Service Unit.

Feature code: A number that is used to activate a particular feature.

Feature programming:

Feature *

Allows you to program a feature code onto a memory button. To erase a memory button, enter

Feature *

Forward: See Call Forward.

Forward delay: The number of rings before an unanswered call is forwarded to another telephone when the Call Forward No Answer feature is ON. Forward delay is assigned in Administration programming.

Forward No Answer: See Call Forward No Answer.

Forward On Busy: See Call Forward On Busy.

Full Autohold (on idle line):

When this feature is ON, if you select an available line, and then do something which selects another line, the first line is put on hold. Full Autohold is enabled in Configuration programming.

Full Handsfree: See Handsfree.

G**Group Listening:**

Feature 8 0 2

A feature which allows you to have others in your office hear a caller through your phone's speaker. The caller hears you only when you speak into the receiver and cannot hear other people in the office. You can cancel Group Listen for the current call. Group Listen is cancelled automatically when you hang up the Group Listen call. To cancel, enter

Feature # 8 0 2 .

H**Handsfree:**

Handsfree

A feature you can use to make calls without using the telephone receiver. Full Handsfree is activated in Administration programming. When it is activated, a Handsfree/Mute button is automatically assigned to the telephone.

Handsfree (HF) Answerback:

When activated, this feature automatically turns ON the microphone at a telephone receiving a Voice Call so that the person receiving the call can respond without lifting the receiver. It is activated in Administration programming.

Handsfree/Mute button: See Handsfree.

Headset: A head-mounted or ear-mounted telephone receiver that is used instead of the hand-held receiver. Headsets are not Norstar components and must be supplied by the customer.

Held (Line) Reminder:

A Norstar telephone rings and displays the message **Held call** when an external call has been placed on hold for a certain period of time. The Held Line Reminder feature and Remind delay are set in Configuration programming.

HF Answerback: See Handsfree Answerback.

Hold button:

Hold

This button is used to suspend calls so that the person using the telephone can perform another task without disconnecting the caller. To place a call on Exclusive Hold so that it can be retrieved only at your telephone, enter

Feature 7 9 or
Feature Hold .

Hookswitch Flash: See Link time.

Host System Signaling: (Also referred to as End-to-End Signaling.) Norstar telephones can access a remote system or dial a number on an alternate carrier by means of Host feature activation, such as Link, Pause and Run/Stop.

Hotline: This feature automatically calls a pre-assigned number when the telephone's receiver is lifted or the Handsfree/Mute button is pressed. A Hotline number can be an internal or external number. Hotline is assigned in Administration programming.

I

I/C: An abbreviation of Intercom button.

Intercom button: A button which provides access to internal lines used for calls within a Norstar system and access to external lines through a Line Pool or external code. A telephone may be assigned zero to eight Intercom buttons. This is done in Configuration programming.

Intercom keys: See Intercom button.

Internal line: A line on your telephone dedicated to making calls to destinations inside your Norstar system. An internal line may still connect you with an external caller if you use it to access a line pool or to pick up a call using Norstar call handling features such as Call Park or Call Pickup Directed.

Internal number: A number (also referred to as a Directory Number or DN) that identifies a Norstar telephone or device.

Internal user: Someone using a Norstar telephone within a Norstar system.

K

Key Service Unit (KSU): The central hardware component in the Norstar system. The KSU has its own processor and memory, and provides a physical point of connection for the various types of devices, telephones, and expansion modules used in Norstar. The KSU can function on its own as a basic system (with 24 Norstar telephones and 8 external lines), or with the addition of a Trunk Module (TM) which supports more external lines, or a Station Module (SM) which supports more Norstar telephones.

L

Last Number Redial:

Feature 5

A feature that allows you to redial the last external number you dialed.

Line: The complete path of a voice or data connection between one telephone (or other device) and another.

Line abilities: In Administration programming, the heading under which you assign Line Filters, Remote Filters, and Remote Access Packages to lines.

Line filter: See Dialing filter.

Line names: In Administration programming, this sub-heading allows you to assign names to external lines.

Line number: A number which identifies an external line. The total number of lines depends on how many Trunk Modules are installed.

Line Pool:

Feature 6 4

A group of lines used for making external calls. Line Pools provide an efficient way of giving a telephone access to external lines without taking up many line buttons. A line is assigned to be a member of a Line Pool in Configuration programming.

Line Profile: A feature you can use to review the settings that have been programmed to lines in Configuration and Administration programming. The settings cannot be changed with this feature. Line profile is available only on the M7310 and M7324 telephones.

Line Redirection:

Feature 8 4

A feature which allows you to redirect all calls on an incoming line to a destination outside the Norstar system. Once a line is redirected it cannot be answered within the Norstar system. The system may be set up to give a brief ring when a call comes in on a redirected line. This feature differs from Call Forward in two ways. It redirects only external calls (not internal calls) and it redirects calls to destinations outside the system. Call forward redirects calls only to destinations inside the Norstar system. See Call Forward and Redirect Ring. To cancel Line Redirection, enter

Feature # 8 4 .

Link:

Feature 7 1

If your Norstar system is connected to a Private Branch Exchange (PBX), you can use a Link signal to access special features. The Link signal can also be included as part of a longer stored sequence on an External Autodial button or in a Speed Dial code. The Link symbol () uses two of the 24 spaces in a dialing sequence.

Logit:

Feature 8 1 3

Logit lets you manually log call information when you are connected to a call.

Long Tones:Feature

A feature that lets you control the length of a tone so that you can signal devices such as fax or answering machines which require tones longer than the standard 120 milliseconds.

M

M7100 Telephone: A telephone with a single line display and one programmable memory button without an indicator.

M7208 Telephone: A telephone with a single line display and eight programmable memory buttons with indicators.

M7310 Telephone: A telephone which has a two line display, three display buttons, 10 programmable memory buttons with indicators, and 12 dual memory programmable buttons without indicators. An M7310 can be equipped with a Busy Lamp Field.

M7324 Telephone: A telephone with a two line display, three display buttons, and 24 programmable memory buttons with indicators. An M7324 telephone can be equipped with a CAP module.

M7900 Telephone: A telephone with a touch screen display which replaces the display and memory buttons of other Norstar telephones. It provides simplified access to Norstar Features and an interface to computer driven applications.

Maintenance: A type of programming that is used to diagnose and repair problems in the Norstar system. Maintenance requires no programmable settings.

Memory buttons: Buttons which can be programmed to dial frequently used features or numbers automatically. See M7100, M7208, M7310, M7324 and M7900 telephone entries for their exact memory button configurations.

Message:

A feature that allows you to send a message to another Norstar user. The Message feature also lets you know if you have any messages waiting, and it maintains a Message Waiting List to keep a record of your internal messages and your (external) voice mail messages.

To leave a message on the display of another telephone in your Norstar system, enter

Feature . On a telephone with a two-line display, this code will also allow you to show and scan the messages you have sent. To cancel a message that you have sent, enter

Feature .

To erase an item in your Message Waiting List, enter

Feature .

Move Line buttons:

Feature

A feature that allows you to move external lines to different buttons on your telephone.

Music source: A radio or other source of music can be connected to the Key Service Unit to provide music for the Music on Hold and Background Music features. A music source is not part of the Norstar system and must be supplied by the customer.

N

Names: Names can be assigned to System Speed Dial numbers, external lines, telephones, and Service Modes. This is done in Administration programming. You can use up to sixteen characters to name a System Speed Dial number, and seven characters to name a telephone, line, or Service Mode.

If a Name has not been assigned, the line number or DN will appear on the display instead of a Name.

Night Service: See Service Modes.

Norstar Programming

Overlay: A paper template which is placed over the top four memory buttons with indicators on the M7310 or M7324 Telephone during programming. The overlay labels indicate the special function that each of the four buttons takes on in programming.

O

On hold: A setting, programmed in Configuration programming, that controls whether external callers hear music, periodic tones, or silence when they are placed on hold.

Overlay: See Norstar Programming Overlay.

P

Page Zone: An area in the office that receives internal Page announcements independently of the rest of the office. Each Page Zone is identified by a number. Telephones are assigned to Page Zones in Administration programming.

Paging:

Feature

A feature you can use to make announcements over the Norstar system. To choose Internal Page (announce over the telephone speakers), enter after the Paging code. To choose External Page (announce over a customer supplied loudspeaker) enter after the Paging code. For both Internal and External Page, enter after the Paging code.

Park prefix: See Call park prefix.

Park timeout: The time before an unanswered parked call is routed back to the telephone which parked it. Park timeout is in Configuration programming. See Call Park.

Password: A password is a specific sequence of digits that you enter to gain access to Norstar programming, to override dialing restrictions, or to use Remote Access with DISA. Passwords are also required for System Startup and Administration programming. See Class of Service password.

Pause:

Feature 7 8

A feature that enters a 1.5 second delay in a dialing sequence on an external line. This is often required for signaling remote devices, such as answering machines, or when reaching through to PBX features or Host systems. The Pause symbol (⏸) uses one of the 24 spaces in a dialing sequence. For Pulse Dialing, * inserts a 1.5 second pause into the dialing sequence.

Personal Speed Dial:

Feature * 4

Two-digit codes (71-94) can be programmed to dial external telephone numbers. Personal Speed Dial numbers are programmed for each telephone, and can be used only at the telephone on which they are programmed.

Pickup Group:

Feature 7 5

A telephone can be placed into one of nine Call Pickup Groups. A call ringing at a telephone within a Pickup Group can be picked up at any other telephone within the same Pickup Group. A telephone is assigned to a Pickup Group in Administration programming.

Pool: See Line Pool.

Pre-dial: A feature that allows you to enter a number and check it on your telephone display before it is actually dialed. If the number is incorrect, you can edit it. The number is dialed only when you pick up the receiver or select a line.

Prime line: The line on your telephone which is automatically selected when you lift the receiver, press the Handsfree/Mute button or use an external dialing feature. A Prime Line is assigned to a telephone in Configuration programming.

Prime Set (Prime Telephone):

A telephone which provides backup answering for incoming calls on external lines. The Prime Telephone for a line will ring for any unanswered calls on that line. A Prime Telephone is assigned to a line in Configuration programming.

Priority Call:Feature ☐ 6 ☐ 9

If you get a busy signal when you call someone in your office, you can interrupt them for an urgent call. This feature is enabled for a telephone in Administration programming.

Privacy: This feature determines whether a Norstar user may select a line in use at another telephone and join an established call. Privacy is enabled in Configuration programming, but can be turned ON and OFF by users during individual calls.

Private line: See Private to.

Private network: A telephone network consisting of owned or leased telephone lines used to connect different offices of an organization independently of the public network.

Private to: A line can be assigned, in Configuration programming, to one telephone as a Private line. The line cannot appear on any other telephone, except the Prime Telephone for that line. Private lines cannot be placed into Line Pools.

Programmed release:Feature ☐ * ☐ 8 ☐ 9

A feature that performs the function of the ☐ **PLS** button in a programmed dialing sequence.

Programming: Setting the way the Norstar system will work. Programming includes system-wide settings and individual telephone and line settings.

Programming Overlay: See Norstar Programming Overlay.

Programming reminders:

Charts on which you can record some commonly-used settings from Administration programming to keep the Norstar system's records up-to-date.

Public line: An external line which can be assigned to any telephone and to many telephones. A line is assigned as Public in Configuration programming.

Public network: The regular telephone network which connects most homes and businesses.

Pulse/Tone Dialing:

An external line setting for pulse or tone dialing. Pulse is the traditional method of dialing used by rotary dial or push button single-line telephones. Tone dialing allows telephones to communicate with other devices such as answering machines. Tone dialing is required to access the features that PBX systems may offer or to use another Norstar system remotely.

R

Recall: See Link time.

Receiver The handset of a telephone.

Redirect ring: In Administration programming, this subheading allows you to set whether a line that has been redirected through Line Redirection will give a short ring on those sets on which the line appears.

Remind delay: When a call has been on hold for a set period, the telephone beeps and displays the message **Held call**. This period is the Remind delay. It is set in Configuration programming.

Remote access: The ability to dial into a Norstar system from outside the system and make use of selected Norstar features. The lines, features, and dialing capabilities available to a remote user are determined by the Class of Service. If the remote access line is answered with DISA, the user must enter a Class of Service password to gain access to the Norstar system's features.

Remote access dial filter: See Remote filter.

Remote access package: In Administration programming, this subheading lets you set up access to Paging and Line Pools for remote users.

Remote capability: A subset of Norstar features that are available to users connected through remote access.

Remote filter: A dialing filter applied to a line in order to control which digits can be dialed during an incoming remote access call. It is the equivalent of a set filter for a remote user.

Remote paging: This feature allows remote users to use the Norstar paging feature. Access to this feature is governed by the Class of Service for the call. See Remote Access and Class of Service.

Remote User: Someone who calls into a Norstar system from a telephone outside that system and uses Norstar features or lines. See Remote Access.

Restrictions: One component of a Dialing filter. Restrictions are numbers you cannot dial when that dialing filter is in effect. See Exceptions.

Ring Again:

Feature 2

A feature that can be used when you can't get through to someone on your Norstar system because their telephone is busy or there is no answer. Ring Again instructs the Norstar system to inform you when they hang up or next use their telephone. You can cancel your Ring Again request by entering

Feature # 2 .

Ring Type:

Feature * 6

A feature that allows you to select one of four distinctive rings for your telephone.

Ring Volume:Feature * 8 0

A feature that allows you to set the volume at which your telephone rings.

Ringling: A setting which assigns a line to ring or not ring at a telephone. If a line has been assigned as "No ring", an incoming call is shown by a flashing indicator only. Ringling is set in Configuration programming.

Ringling Sets (Ringling Telephones):

Those telephones which have been assigned to ring when a line has been placed into a Service Mode. Ringling Telephones are assigned in Administration programming.

RIIs button: The Release button ends a call in the same way that hanging up the receiver does. It may also be used to end Startup, Configuration programming, Administration programming, Maintenance sessions and feature operations.

Run/Stop:Feature * 9

A feature that creates a breakpoint in a programmed external dialing sequence. When you press a programmed key, the system dials the number up to the run/stop. When you press it again, the system dials the digits following the run/stop.

S

SAPS: See Station Auxiliary Power Supply.

Saved Number Redial:Feature 6 7

A feature that allows you to save the number of the external call you are on (providing you dialed the call) so that you can call it again later.

Selective line redirection: See Line Redirection.

Service Modes:Feature 8 7

A feature that places one or more lines into a Service Mode. This is usually done to provide special ringing and telephone access after normal office hours, or when there are few people available to answer calls. Service Modes settings are assigned in Administration programming. To return to normal operation or cancel the manual override of an automatic mode, enter

Feature # 8 7 .

You cannot cancel an automatic mode with this code.

Set: A telephone.

Set ability: In Administration programming, the subheading under which set filters, line/set filters, and a variety of system features are assigned to individual telephones.

Set Copy: A programming section that allows you to copy programmable settings from one telephone to another of the same type. Set Copy provides two options: duplicating System Data and User Data, or duplicating System Data only. Set Copy does not provide the same copy capability as the **COPY** display button, which is more selective of the settings that can be duplicated.

Set filter: See Dialing filter.

Set lock (Telephone lock): This feature allows you to limit the number of features that may be used or programmed at a telephone. Full set lock allows very few changes or features, Partial set lock allows some changes and features, and No set lock allows any change to be made and any feature to be used. Set lock is assigned in Administration programming.

Set Names: In Administration programming, this sub-heading allows you to assign Names of up to seven characters to telephones.

Set Profile: A feature you can use to review the settings that have been assigned in Configuration programming and Administration programming. The settings cannot be changed with this feature. Set profile is available only on the M7310 and M7324 telephones.

Set Relocation: See Automatic Telephone Relocation.

Shift button: A small triangular button beside the dual memory buttons on the upper half of the M7310 Telephone. You press the shift button to store or access features on the top half of the dual memory buttons.

Show Time:

Feature

While on a call, accessing this feature lets you see the current date and time on the Norstar telephone display.

Station: An individual telephone or other Norstar device.

System Coordinator: The person responsible for customizing the Norstar system through Administration programming and for helping co-workers use the Norstar system.

System Data: An option in the Set Copy function. System Data refers to the system settings which apply to all telephones and lines. System Data consists of the programmable settings from System Startup and Administration programming. It also includes the settings programmed in Configuration programming.

System Speed Dial: In Administration programming, a heading under which you can assign up to 70 numbers as System Speed Dial numbers.

System Speed Dial code:

A Two-digit code (01 to 70) that can be programmed to dial a telephone number up to 24 digits long. System Speed Dial codes are programmed for the entire Norstar system in Administration programming.

System Speed Dial Name:

In Administration programming, a subheading under which you can assign a name to a System Speed Dial number.

System Startup: When a Norstar system is first installed and powered up, System Startup must be performed before any programming can be done. Startup initializes the system programming to defaults.

System Startup access code:

To begin System Startup, enter * * S T A R T . An Installer password is required before System Startup can begin.

T

Tandem call: A call established when a remote user dials into the Norstar system and uses the system to place an outgoing call. The combination of the incoming and outgoing calls forms a tandem call. See Remote Access.

Time and Date: The current Time and Date appear on the display of idle Norstar telephones. Time and Date can be changed in Administration programming.

Timed release:

A feature that inserts a 1.5 second pause into a sequence. You can use it in a dialing sequence for accessing a remote system such as a PBX. You can also dial it if you wish to release a call from your line but keep the line for another call.

Transfer:

A feature which lets you redirect a call to another telephone in your Norstar system, over a network or outside your Norstar system. There are four types of Transfer; Transfer using Hold, Transfer with Announcement, Transfer without Announcement, and transfer using Unsupervised Conference.

Transfer Callback: If a transferred call is not answered after a specific number of rings, the call will return to the telephone which made the transfer. The number of rings is assigned in Configuration programming. Transfer Callback does not apply to calls transferred externally.

Trunk: The physical connection between the Norstar system and the outside world using either the public telephone system or a private network.

Trunk Answer:Feature

A feature you can use to answer a call on any line that has an active Service Mode, even if that line does not appear on your telephone. Trunk Answer is enabled in Administration programming.

U

Unsupervised line: A line for which disconnect supervision is disabled. If an external caller hangs up, the Norstar system does not detect the disconnection and does not hang up its line. See Disconnect Supervision.

User Data: User Data is an option in the Set Copy feature. User Data refers to the personal settings which are unique to an individual telephone, and are not programmed in Configuration or Administration programming. User Data is programmed at each telephone. These settings, for example, include Personal Speed Dial and the assignment of programmable memory buttons.

User Filter: See Dialing filter.

V**Voice Call:**Feature

A feature you can use to make an announcement or begin a conversation through the speaker of another telephone in the Norstar system. The telephone you call will not ring. Instead, the person you call will hear a beep and then your voice. Their telephone will beep periodically to remind them that their microphone is open.

Voice Call deny:Feature

A feature that prevents your telephone from receiving Voice Calls. To cancel Voice Call deny, press Feature # .

Voice Message Center: If you have subscribed to Call Display services you can receive visual Voice Message Waiting Indication, providing your telephone has a display. If you have Voice Message Waiting Indication, you can program the telephone numbers required to access up to five different Voice Message Centers. You can also program which of the five Centers is to be accessed by each specific line.

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After you have finished programming, store your
Norstar Programming Overlay in these slots.

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